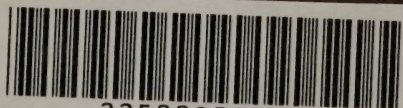


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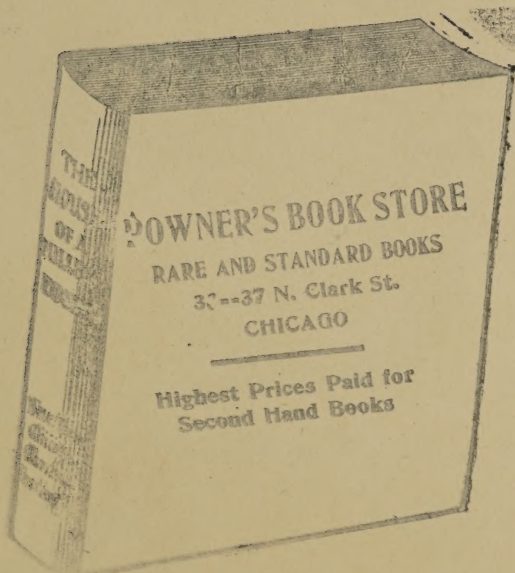
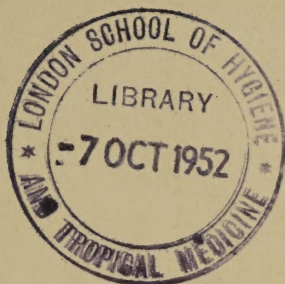








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# PUBLIC HEALTH

PAPERS AND REPORTS

VOLUME VII

PRESENTED AT THE NINTH ANNUAL MEETING OF THE

**American Public Health Association**

(SAVANNAH, GA., NOV. 28 TO DEC. 3)

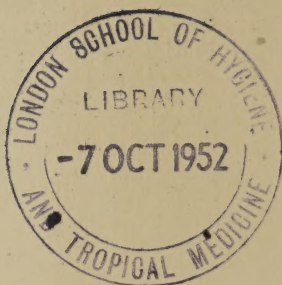
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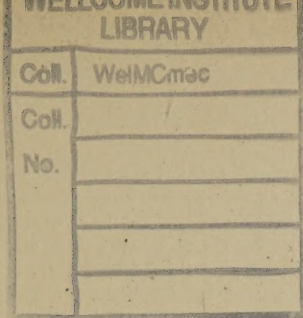


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## I.

### THE PRESIDENT'S ADDRESS.

By C. B. WHITE, M. D.,  
*New Orleans, La.*

MEMBERS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, I welcome you to its ninth annual meeting.

On the 12th of September, 1872, twelve gentlemen met at Long Branch, elected to membership other three present by invitation, and held the first meeting, that of organization of this Association.

To one then present it is pleasant to note that its members number seven hundred, and that aided by a fortunate combination of circumstances, nearly four hundred members were in attendance at the meeting at New Orleans. Of those present at that meeting of organization, which we now see was so important and opportune, two are dead, — Carl Pfeifer, Esq., civil engineer and architect, and Dr. John M. Woodworth, late Surgeon-general of the United States Marine Hospital Service. Had they done no other worthy work, their prescience, and interest, and practical part in forming this Association, would be monumental.

It is my official and sad duty to announce the death during the past year of Dr. George S. Blackie, Nashville, Tenn.; Dr. Greenville Dowell, Galveston, Texas; Dr. W. C. W. Glazier, United States Marine Hospital Service; Dr. E. Lloyd Howard, Baltimore, Md.; Dr. L. S. Joynes, Richmond, Va.; Dr. Charles H. Smith, Richmond, Va.; Dr. E. M. Wight, Chattanooga, Tenn.

The time allotted to this address is much too short to justly set forth the many and valuable services of these dead associates. I therefore recommend to the Association the creation of a committee, which, before we separate, may place before us the leading events of their lives, and prepare a memorial for the volume of the year's Transactions, which shall fully illustrate their services and virtues.

Physicists tell us that the warmth, light, and life of our earth depend on rapidly recurring, incessantly repeated, oscillations, propagated through space by the mysterious inconceivably great energies of the sun. Every brief undulatory wave of force has its value, duly performs its work, surpassed by neither successor or predecessor.

Every generation of man has its own work, labor impossible to be done by one antecedent, or a following one. Neither has the work of the one going before, or of that coming after, greater importance. The generation

or the man that does the best possible, has done as well as those before him have done, or as successors can do. The curse of the world is its idlers awaiting opportunity.

The man who does the thing next him that requires doing has no need to wait for occasions — he makes opportunity.

Endeavor to benefit by the consolations of philosophy as we may, all thoughtful persons can but greatly lament the loss of men of fine intellectual powers, matured by labor, experience, and time, dying at such period of life, that to benefit mankind there might be justly expected ten or twenty years of clearest thought, of well-directed, practical work of the best quality, of wise and wide influence.

These, our associates, have ceased to labor, some of them while comparatively young, feeling that they had learned a little, only enough to begin to study to advantage, and were eagerly looking forward to more rapidly-gained increments of knowledge and to riper and more abundant accomplishments in the future. As with them, so with others; the plow may be stopped afield in the furrow. For some of us the time is assuredly short. Let us take our lesson of self-sacrifice and industry and honesty of purpose from these our dead, and turn to the living, to our duties and opportunities, from the contemplation of what they worthily did to what there is for us to do.

Early in the year a circular of inquiry was sent to the members of the Advisory and Executive Committee, and to former presidents of the Association, requesting them to name those topics of sanitary science which seemed to them worthy of especial consideration at the Savannah meeting. In the replies forty different subjects were so characterized. Of those mentioned by more than one person were five; disinfectants recommended by two; the parasites, or diseases of food animals, by three; house hygiene by three; vital statistics, nomenclature, registration, etc., by three; hygiene of the school and scholar by four.

The most peculiar replies from our "sanitary philosophers" were these:

"The time of the Association could be best occupied in correcting the false theories announced at former meetings." Another suggests for discussion, "Whether there be such a thing as sanitary science."

We may construe the lesson of these numerous and so varied answers to be, that those interested in the science of hygiene are pushing its advance along a well-extended front; that much of our work is done on the principle of a man's doing what he finds to do "over against his house."

That some theories have been adventurously thrown out, much as some railways have been advanced on cribwork laid upon the long-grassed sod of Louisiana's "trembling prairies," across which travelers get by audacity, velocity, and luck, but which the steady, slow going, scarcely-noticed construction trains of a later date will fill in, be it with solid material or accumulated fact, till the shaking roadway, and the swift but fortunate transit, becomes the established, the sure, the safe.

Others of theories advanced to serve as highways of science, are, I greatly fear, as the Slough of Despond, wherein Christian was so woefully bemired,

in which Bunyan tells us had been swallowed up at least twenty thousand cart loads, yea, millions of wholesome instructions, but it remained still a slough.

The idea that there is no such thing as sanitary science, even though jocosely suggested, or as an occasion of wit in others, to create discussion, would not be surprising if seriously meant.

Almost the whole of the enormous outgrowth of modern discovery and classified knowledge belongs to the present century, and it may be said of hygiene as of the doctrine of evolution, that it has barely come of age. Sanitary science is a dependence and consequence of general scientific research and progress.

Observers have long existed. We have had men prescient, far in advance of the generations, sanitarians, vital statisticians laboring to lay the sure foundations of preventive medicine.

But a glance to-day at the condition of even the records of mortality throughout the United States shows a lack almost disheartening of accurate statistics. A few cities and towns, with perhaps two or three States, have a fully recorded mortality.

The registration of diseases, even of those contagious, is, with possibly a few exceptions, only a well meaning and well deserving attempt.

To-day our most honest, philosophical minds, those whose opportunities for forming correct judgment have been longest and best, are in doubt whether yellow fever be a disease always imported, or from former importation now become endemic, or occasionally imported and sometimes surviving mild winters, or be an indigene, in some way bred from malaria or evoked from filth, or be always home-bred and in-bred, a glandular disease, perhaps developed by general bad environments. Such contrariety of opinion could assuredly have been merged into the unanimity of knowledge had there been twenty years of observations, conducted with scientific accuracy and completeness.

It will only occupy a few moments of your time to illustrate by example the material sometimes furnished to men of science from which to draw conclusions.

A surgeon of a regiment lately assigned to an army corps, at the close of the month sent in the customary monthly report. As all feeble men had been removed from the regiments preparatory to an active campaign, and the corps lay in a healthy location at a healthy season of the year, the number of the sick, and the diseases from which they suffered, attracted the attention of the medical director. The next report presented the same peculiar features. The surgeon was sent for and explained: "I keep no daily record, so at the end of a month I sit down and think how many have been sick, and then, running my eye along the list of diseases, I pick them out in equal numbers, so as to make an interesting and variegated report."

Scientific methods and the scientific quality of mind are foreign to many of those who are interested students, and even writers on hygiene. The scientific order of mind can be bred as we develop certain qualities in our domestic animals. As scientific studies are made more familiar to scholars,



and scientific modes of thought and teaching are applied in the education of the young, and increasingly regulate the habit of thought of later years, so generation upon generation will become better suited by hereditary, innate quality of intellect to seek and obtain truth by exact methods. As we are almost at the beginning of the knowledge of proper methods, so we are only at the beginning of the proper use of them, and can hopefully look forward to the appearance of steadily increasing numbers of those vastly better furnished intellectually to apply and use them than is the present generation. In the immediate future of all science progress promises to be "progression," perhaps even "geometrical."

Many statements assumed to be facts, numerous hasty generalizations based upon incomplete, unfair, or imperfectly recorded observations, theories eagerly thrust forward by illy constituted or badly trained minds, or truths perverted or misused to fill a pocket, or build a "balloon frame" reputation, appear in the scientific columns of newspapers, or occasionally find place in journals devoted to genuine research and to the discussion of well founded working theories. Soon refuted by the logic of events, or the later theory of another pseudo scientist, or cut through by the merciless edge of fact in the hand of one of the elect of truth, theories and theorists disappear together.

The resonant, glittering, but empty brass no longer blinds the eye or stuns the ear. Unfortunately, others similarly plausible or impudent follow in so numerous and extended procession as to cause those not well founded in underlying principles to say: "Is there such a thing as sanitary science?" The old perplexities cries out afresh: "What is truth?"

Brief consideration of certain qualities of mind necessary to the perfect man of science, instead of causing discouragement at slow progress, will rather cause surprise at the advance made.

To avoid self deception is the most difficult of problems. Like the perfected balance of the chemist and physicist, shut out from all perturbing influences, affected by and accurately recording the most minute accretion, the perfectly ordered scientific mind, free even of personal equation, would perceive, and yield to, and appreciate the smallest increment of fact, no matter to which end of the beam it lay. In apparent antithesis, such a mind would be not merely receptive, but hospitable to foreign or novel ideas.

Far from neutral, it would be eager for knowledge, penetrated with a very hunger for truth. Therefore we may happily be encouraged, seeing that whilst man is imperfect, and his capacities limited and immature, so much has been accomplished by a sincere desire for truth, and an earnest purpose to lessen the miseries and increase the enjoyments of mankind.

In periodicals and papers, and from the lecture stand, we hear of filth and "filth diseases." We are told that "to be clean is next to being godly," for as the one insures the salvation of the soul so the other saves the body. Every outbreak of disease is announced as due to neglect of some form of washing. Next, a scientific commission reports that the workmen and their families, employed and living for years at some "knackery" in the midst of decaying and corrupted animal matters, breathing an atmosphere loaded

with animal particles, and of a stench unbearable to those not made tolerant by long exposure to it, nevertheless enjoy good and continuous health.

All medical men have observed children born and brought up in unwholesome localities, with eminently unsavory surroundings, scarcely washed between birth and marriage, yet unmistakably in possession of firm health.

I have in mind a man whose domicile is in a swampy location, and whose premises as a whole have been a standing nuisance for thirty years, offensive to the nostrils and eyes of neighbors, and for whose exceeding bad condition he has been subjected to repeated suits by the health authorities. This man lives in mud and manure, not over cleanly, and frequently drunken, his only water supply an above-ground uncovered wooden cistern, on whose margins chickens roost, having one sanitary virtue — but that one the greatest of them all — he is a good eater! Despite unfavorable environments and habits he has high health, quickly recovers from accidents, and, unless untimely slain by one of them, bids fair at some future "All Saints' Day" to visit the graves of the sanitary inspectors and officers who have successively assaulted him.

The existence of such facts, or the announcement of such statements, as facts, surprise and confound most readers.

The experienced and fully informed mind reflects that observations may not have been sufficiently extensive, or not sufficiently extended as to time; that as vital questions involve many factors, some may have been overlooked, or not duly considered; that an important element may be recognizable by consequences which appear at a remote date; that the results of evil practices may be found nearer the end of life, as an early, decrepit old age, instead of an old age, vigorous and late; or that children born of those living in such unfortunate circumstances, thence inherit a feebler organization and low viability.

The sanitarian of broad views looks at the healthy child with dirt-be-grimed skin, but underneath the filth the mind's eye sees a texture secretive, exhalent, extrusive, the exact opposite of an absorbent surface, throwing off poisons from the interior, and practically impassible to poisons from without.

The sanitarian perceives the air none too savory, his microscopic examination of similar atmospheres has revealed spores, bacteriæ, particles of animal matter, alive and dead, but he bethinks himself of the arrangements for entangling and returning much of this matter before it reaches the ultimate air cells, and especially of that wonderful lining tissue of the lung, which with chemical precision passes in oxygen and lets out carbonic acid and vapor of water, yet with such certainty retaining the blood upon its other side that one may see a thousand cases of that dread destroyer of texture and blood, yellow fever, and see but a single case of hæmorrhage from the lungs, and even that in one already a consumptive.

Such reflections naturally suggest the widely diverse nature and methods of the hygiene of the individual and race hygiene.

In the shipwreck we see a single person outlasting all others of the company, defying flaming sun and winter's rigor, the pang of hunger and the

anguish of thirst ; or in the disastrous retreat, those who outlive frost, famine, and fever. If a deadly epidemic rage, we see those who altogether resist it, or if attacked recover, despite lack of professional care, violation of the most ordinary rules of prudence, and with every circumstance inimical to recovery. Or we see the subject of some wasting, generally fatal, disease, or the victim of street conflict, or steamboat disaster, or railway accident, groaning "with the groans of a deadly wounded man," yet seemingly finding it impossible to die, and to the amazement of the profession and on lookers, outlasting all malign prophecies, recovering health, and again doing his part of the world's work.

This limitless endurance, this clenched tenacity of life and enormous viability are at once the evidence and the result of race hygiene.

Nature, by the process of selection, mercilessly weeds out the feeble.

Careful as she would seem in securing abounding numbers of the race, as a whole, she takes no thought of the individual. Nature, too, would seem to exercise small judgment in her severity. The tables of the world's death rates show that in cities more than one half, and in the country nearly one half, born into the world die on or before completing the fifth year of their existence. Physicians remember infants of exceeding feebleness or suffering from long and wasting sickness retaining life even, contrary to all expectation, yet now developed into robust young men, or healthy, strong, and comely women.

The hygiene of the individual only would here if applied immensely and immediately decrease this death rate, so shocking to the human mind.

It is impossible to believe that one half of the human race is born non-viable. If it were true, most appropriately this multitude of slain innocents might join in the tombstone soliloquy of the infant buried in the London cemetery, dead at one day old, "If so soon I am done for, I wonder what I was begun for."

These much enduring disease, death-resisting specimens of the human family, before spoken of, show what a succession of fortunately envired generations can develop. The surroundings of these persons may have been altogether highly favorable, but it is the continuance of them through a series of generations which has furnished the result. As education may do much for a man, but what he was in the beginning before he received education, what the product of the generations was, is the main and true reason of what the man becomes ; so hygiene of the individual, like his education, has a certain and large value to him, but the "Sanitary Philosopher," while appreciating this and earnestly working for the best hygiene of the present, loves even more to look upon the great result to the human race of the hygiene of the individual maintained during a series of generations. His prophetic eye is filled with pleasant visions of the race in possession of higher health, longer life, and greater intelligence, a better aptitude for scientific and literary pursuits, and every avocation of life.

The happy circle of his view shows man with bad passions in control, his pleasures purer, more numerous, more exquisite, and less exhausting.

How fortunate for both the present and future age, did parents appreciate



the worth of correct sanitary practices, and wisely think and do for both themselves, their children, and their children's children. Grateful and graphic is the simple old world picture of a city prosperous and healthy: "There shall yet old men and old women dwell in Jerusalem, and every man with his staff in his hand for very age. And the streets of the city shall be full of boys and girls playing in the streets thereof."

Were the laws of hygiene exactly known, certain isolated individuals, by careful and continuous obedience, might expect to obtain the largest benefits in the way of life, and health, and enjoyment, that their own careful effort, and the constitutions and practices of their ancestors permitted, and also to transmit to posterity a still further improved heredity; but alas! the epidemic diseases forcibly intrude themselves, bearing and peremptorily enforcing the lesson that no man liveth unto himself; that personal hygiene is not simple but complex; the interests of the unit and of the sum total of the community are found to be one; the would-be selfish human monad can neither live or perish to himself, and state medicine is at once a natural outgrowth of human relations and a necessity.

There is nowhere just or general appreciation of the importance which attaches to the position of the representative of State medicine, Health Officer, or Board of Health. To properly exercise their functions, as for a single example, to deal effectually with epidemic diseases, includes the knowledge of the nature, cause, habitat and habits of such sicknesses if known, and methods of repression available. They must precisely be informed of what is and what is not known, must have broad views, executive ability, and fearlessness of the highest personal and moral order.

The exceptional quality of such labor deserves equally exceptional pay.

To the contrary, I know of but one locality in the United States where those responsible for the public health are paid in such measure as railroad companies, banks, or great mercantile corporations, recompense work of similar high value.

The excuse for a contrary procedure sometimes is, that the work does not require all "the doctor's" time, that there is not much to do, and frequently "the doctor," miscalled sanitarian, thinks so too. To keep well informed in advancing hygiene, without doing any original scientific work, will occupy the time of any man who is practically engaged even a part of the time.

That man is often the best employed, and most overworked sanitarian, who is doing nothing at the moment for the citizens under his care, but who is eagerly widening the too narrow limits of his knowledge, accumulations of which are even better than the domestic "saving up" of articles of no apparent value, for a piece of information seldom waits seven years to come of use.

The man who thinks there is little to do or learn is of that opinion because he does not know the extent of his ignorance.

The truth is, sanitarians go a warfare at their own charges.

Physicians whose livelihood is directly and solely derived from the treatment of the sick have in all time been incessant in discourse and labor for the prevention of sicknesses.

The sanitary work of the world has been done, and to-day is being done, for love of knowledge and love of man.

Sanitary science has reached the point that further great advance, its most gainful researches, can be secured only by the expert, who gives all his time to study and practice, and brings to his work intelligence, knowledge, and training. I cannot refrain from a moment's mention of a single important service to be expected from this class of practical thinkers. In this country the mass of those interested in, and even of the actual workers in science, are, so to speak, amateurs. We may call them the irregular troops, the volunteers, the free lances of science, possessing an abundance of zeal, with an equally abounding insufficiency of knowledge. To this great number our expert force will be of incalculable value, in the words of Mr. Vernon Harcourt, "the law giver and proper founder of the British Association for the Advancement of Science," "giving a stronger impulse and a more systematic direction to scientific inquiry ; in pointing out the lines of direction in which the researches of science should move ; in indicating particulars which most immediately demand investigation ; in stating problems to be solved and data to be fixed."

This class of service, difficult to obtain, now and in the future grown to be essential, must be furnished by the State.

But were this complete arrangement for the hygienic care of the man as an individual and a citizen secured, each State, sovereign though she be, is yet one of a fairly large family. Diseases prevailing in one may threaten another member of the family, and the precautions needful overpass boundary lines, and require a higher power, unsectional and impartial, to arrange, adjudicate, and regulate. This higher health authority, of necessity national, can well receive, arrange, record, and publish the vital statistics of the whole country, make researches not within the scope of State power and interest, receive information of the presence, increase, or decline of disease throughout the country, or even ultimately forecast the state of the public health, and issue its bulletins of instruction, of warning, or of comfort.

The rapid transit of civilization having brought the nations into vicinage, intimacy of intercourse requires international sanitation and national sanitary commissioners.

To maintain what small advantages sanitary science has secured, to obtain the benefits which will accrue from the practical working of the sanitary scheme so curtly sketched, is the important matter pressing on us and all sanitarians. One important help to the result will be the establishment of a professional chair and lecture on hygiene in every medical school, attendance upon lectures, and final examination upon that study being made necessary to graduation. The desired result must, however, be mainly attained in one way — educate the people.

We want immediate benefits, therefore we must do that thing so difficult to effect — educate adults. Legislators and governors must learn.

The press must continuously, pointedly, and indefatigably set the truth before its readers. There must be sanitary circulars, and sanitary conventions, and sanitary fairs.

The clergy must preach to the texts, "Know ye not that your bodies are the members of Christ?" and to a following scripture, "What! know ye not that your body is the temple of the Holy Ghost?" They must instruct their congregations in the way of keeping that temple meet for the presence and indwelling of a gracious spirit; they must call aloud for such a life as shall secure that the temples of the future be better and more beautifully builded, and denounce with righteous indignation those who injure or who shorten the life of that most wonderful existence, the human being, the result of God's ages, the flower of evolution.

Above all, take care for the children!

First, secure the writing, publication, and adoption of text-books largely illustrated, suited to different ages. Next, after a specified time allow no one to teach school unless so familiar with the fundamental principles of physiology and hygiene, that children learn not only while the book is in the hand, but constantly receive information from an intelligent instructor, with whom maxims of health and pertinent illustrations are as ready for speech as those of morality and philosophy. In such a system of instruction errors in physical conduct or idea will be pointed out for amendment, as mistakes in grammar, pronunciation, and behavior are corrected.

Introduce hygiene early in course, that what may be then learned serve as a foundation for continued improvement, as a crystal begun gains constant accretions from the mother liquor.

The scientifically taught mind, like a coral growth, with every polyp mouth open, eager to appropriate from the surrounding sea, will be always learning, be it from teacher, book, associate, or wide-open eyed observations. Before finishing the usual round of studies a higher grade of book and study should be traversed to take advantage of mental growth and maturity.

Whatever else be left undone or untaught, sharply, deeply, and abidingly impress upon the mind of the young that at every period of existence 'how to be healthy' is the most important study of every human creature.

The result will be a generation wise in its own interests; its women will do well that largest part of the development of the race and of the hygiene of the home, which is their lot and privilege in life; it will furnish its own experts, whose scientific purposes were kindled and fanned by education, its legislators will be well informed, and therefore favorable to public health interests, and will no longer wish or dare to give to politicians or necessitous and undeserving friends and relatives all the money needed to preserve the health or save the lives of the people.

Could I to-night lift the roofs of houses and hospitals, and show an uninformed and indifferent public; those now lying sick and dying of preventable disease, or pass before it the graves of the tens of thousands of those killed by avoidable diseases within the year just passed, or accumulate the figures and demonstrate the loss of time and loss of wages and expenses of sickness and death, summing, too, the physical sufferings and anxieties of mind unnecessarily endured, or assemble before this ignorant public the exceeding great multitude of little children—the innocents cruelly slain without cause—and their mourning relatives and friends, the community



would rise as one, demand and secure a far-reaching and permanent change. Surely "the people perish for lack of knowledge."

There exist those who maintain that the world is already too crowded, that if sanitary science keeps alive those who now unnecessarily die, the present struggle for existence, ending in the survival of the fittest, will continually become more fierce, and the bitter results of the battle of life, the unavoidable sufferings of those who go down, and are trodden out of existence, will much more than counterbalance all the blessings which perfected science, carried to completed ends, can create.

Answer enough for this age is to point as illustration to Louisiana's millions of acres of deep, black soil, only awaiting sanitary engineering to support a dense, healthful, and prosperous population.

The extraordinary progress lately made by men of science gives sure foundation to the belief that in a future not far remote, the struggle for existence will not be so much man's hand to hand contest with his fellow for life and comfort, but will be rather man's contest with the forces of nature, man the victor, with increasing rapidity turning to his own service energies now wasting themselves about him, more amply supplying necessities, steadily augmenting comforts, and relatively diminishing labor and exhaustion. No longer man against man, but all men brethren, made rich from nature's treasuries.

## II.

### ADDRESSES OF WELCOME.

BY CAPT. GEORGE A. MERCER,  
*of Savannah,*

AND  
DR. RICHARD J. NUNN,  
*President, Georgia Medical Society.*

CAPT. GEORGE A. MERCER, in behalf of his Honor, John F. Wheaton, Mayor of Savannah, addressed the Association as follows :—

MR. PRESIDENT AND GENTLEMEN OF THE PUBLIC HEALTH ASSOCIATION, — As one of the General Committee charged with your reception and entertainment, I have been requested by the municipal authorities to discharge in their behalf the grateful duty of bidding you a cordial welcome to our city. The assembling together for any purpose of so large a number of distinguished and influential gentlemen, from all portions of our country, would be in itself a significant and important fact, for we cannot forget that within a period of less than twenty-five years such a convocation in Savannah would have been impossible, and we must all feel grateful that the dissensions which lately disturbed our country are so effectually healed, and the public health of these United States, in a political sense at least, is fully reëstablished and restored.

But, gentlemen, the purposes that you prosecute, and the mission which you seek to accomplish, add a double significance and meaning to your meeting. I suppose there is no portion of the civilized world where the question of public sanitation is not now attracting the earnest and serious attention of the thoughtful and humane. There is no great city in the world, no matter how ample its resources and appliances in art and science, that does not consider this question one of great and growing importance.

That profound thinker, Herbert Spencer, in his recent thoughtful work on education, says: "As remarks a suggestive writer, the first requisite to success in life is 'to be a good animal;' and to be a nation of good animals is the first condition to national prosperity."

If the importance of your mission is recognized all over the civilized globe, it has a special significance in the particular section of country where you are now gathered together. I once asked an intelligent lady who lived in the South, why it was she made her home here when her means would have enabled her to live in any of the great cities of America or Europe, and she replied: "I prefer to live in the South because it affords me so many more opportunities of doing good." That remark is as true to-day as when she made it. There are many parts of the South where the op-

portunities of doing good are more numerous than in some of the great densely-settled regions of the country.

It is a misfortune to many sections of the South, that in sanitary science and its practical application to the government of life the people are one hundred years behind the progress of the age, and the most unfortunate feature of that condition of things is that they are profoundly ignorant of their ignorance.

I shall never forget a remark I once heard made by that distinguished physician of blessed memory, in Savannah, Dr. R. D. Arnold ; and, gentlemen, permit me to say in passing, if the name of Dr. Arnold is not as familiar to you as to a Savannah audience, it is only because living in this "pent-up Utica," his true dimensions were curtailed. We remember him as the genial companion, and the skilled cook who could descend into his own kitchen when necessity required ; who could carve a joint, and who spiced the entertainment with wit and pleasantry. At another moment we think of him only as the skillful physician, learned in the sanitation of this region, always at his post in times of public peril. I do not think I exaggerate when I say, that when the name of Dr. Arnold is mentioned before a Savannah audience, their mouths and eyes almost unconsciously water.

Some one said in his hearing that there was ample missionary ground in Georgia, and missionaries should be sent there. "Missionaries," said Dr. Arnold, "you had better send cooks ! It would be folly to undertake to educate their souls until you had first reconstructed their stomachs. Throw away the frying-pan and grease, and get the stomachs right ! Until you do this you will always find a great obstacle in the way of salvation."

Now, gentlemen, the practical question that addresses itself to us, and that will address itself to you, holding your meeting here, is this : Can these low-lying, alluvial regions of the South, subject to constant malarial influences, — can they be made the homes of a thrifty white population ? If they can be then the future of this country is assured. If they cannot, it will make but slow, and by no means sure, progress.

Gentlemen, we have confidence in the future. We have confidence in the success of science. We believe in the great mysterious bosom of nature there are locked up wonderful cures which science shall unlock. We believe there are cures and antidotes for almost all the ills that human flesh is heir to. So it becomes a practical question to this region, whether those hidden evils, which we believe in the reach of sanitary cure, can be controlled by science. If they can, we know the success of this region is assured.

But, gentlemen, if the questions you came to discuss are of interest to this entire section, they are of peculiar interest to the people upon whose soil you stand. Situated as Savannah is, in the midst of malarial surroundings, visited every year by vessels which come from infected ports, the great question comes to us, How can we maintain our public health ?

In 1880 we were visited with breakbone fever, a disease which metaphorically breaks the bones and literally breaks the spirit of those afflicted. In 1854, and again in 1876, we were visited by terrible epidemics of yellow fever. The dark and appalling shadows of these calamities still overhang the



prosperity of Savannah. There are many in the sound of my voice who can never forget the sorrows or terrors of that time. Death in its most ghastly form stalked in our streets and invaded our houses, and broken and bleeding hearts and crushed lives were scattered in its terrible track.

Perhaps in referring to these matters I have gone a little too far ; but your meeting here is a matter of peculiar significance and interest to us. We therefore do not only extend you a cordial welcome as individuals, as distinguished gentlemen coming from all parts of our country, but we assure you we appreciate the purpose you come to prosecute.

I have already exceeded the limits of a fitting welcome. Your time is valuable to us and to you, and I must no longer trespass upon it. In conclusion permit me only to say that I do not think it out of place to recall that beautiful tribute which Burke paid to the great philanthropist Howard. He said it was the mission of Howard "to dive into the depths of dungeons, to plunge into the infection of hospitals, to survey the mansions of sorrow and pain, to take the gauge and dimensions of misery, depression, and contempt ; to remember the forgotten ; to attend the neglected ; to visit the forsaken, and to collate and compare the distress of all men in all countries."

In the prosecution of your high purpose you can well afford to share the noble scorn which Sir Walter Scott makes the wife of Rob Roy express toward those who can creep through the world unaffected by its various disgraces, its ineffable miseries, its constantly accumulating masses of crime and sorrow ; who can walk beneath its dark shadows without a sense of gloom ; who can witness its difficulties without emotion ; who can hear its wailing and sad cries without response ; who can pursue the tenor of their way while the dark stream of human suffering and sorrow flows on unheeded or unseen. You will be sustained in the prosecution of your labors by the consciousness that in some portions of our land at least, your work will reach fruition. In some section or some neighborhood, in some city or some hamlet, there will be men and women who will lead happier, wiser, and better lives for the wisdom you have given them and the knowledge you have diffused.

DR. RICHARD J. NUNN, president of the Georgia Medical Society, in behalf of the profession addressed the Association as follows : —

MR. PRESIDENT, LADIES AND GENTLEMEN AND MEMBERS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, — As the presiding officer of the Georgia Medical Society, I have been deputed by that body to perform a duty which is to me a matter of great pleasure. It is to extend to the American Public Health Association the cordial greetings of the medical men of Savannah.

The science of sanitation is indubitably the offspring of civilization. While it is quite the fact that there are many nations claiming high standing in civilization, who have by no means devoted the attention it deserves to matters of public health, it is nevertheless true that where you find questions of sanitation receiving the attention that they deserve, there of necessity you must find a high type of civilization. Equally is it a fact that where igno-

rance on these matters prevails, suggestions touching the public health are, as a rule, received with scoffing and derision, with studied neglect, if not with bitter opposition. It is not uncommon, under such circumstances, to find uneducated officials issuing their dogmas on these subjects, mistaken though they are, with all the authority of the educated expert, and sticking to them with the pertinacity which is born of ignorance. We are all equals here met together at stated intervals from widely separated cities of the Union. We look upon this body with interest, because we regard it as a great public educator as well as benefactor, and we confidently look to the effects of these assemblies as to so educate the public mind that those things of which I have spoken will be numbered with the past, and that sanitary suggestions emanating from the medical profession will receive the just consideration which they deserve ; that they will be discussed with the calmness and the thoroughness that their importance would call for. We trust that by the sheer force of an educated public sentiment questions of sanitation will be forever removed from the arena of financial jugglery or political dogmatism.

That our citizens are fully alive to the importance of sanitation is amply evidenced by the presence here this evening of ladies, and gentlemen not members of the Association. That our city officials feel the importance of sanitation is shown by the assembling here of this august body, that I have now the pleasure of addressing. It is shown by the presence on this platform of members of our City Council ; it is shown by the presence, as presiding officer of this meeting, of our Mayor, which is a sure omen that under his administration the public health will be preserved at all cost, and that the sanitation of Savannah will not suffer.

To the physician, especially, this Association must be an object of favor, if not of affection. He must come to regard it as a temple in which the non-professional investigator and the follower of *Æsculapius* can meet together, and together lay the results of their scientific researches votive offerings on the altar of his daughter.

When once the scope and the objects of this Association are thoroughly appreciated by the masses, the success of the American Public Health Association will become an object of interest to the people at large. Animated by the same beneficent intention, it comes into the palace and hovel alike, caring with equal solicitude for prince and pauper, extending its protecting ægis alike over the pampered child of opulence or the starving infant of the beggar, knowing, in its noble mission, no caste, no creed, no nation, no color, — naught but the pursuit of its noble object, the preservation of human life. What society can be as near and dear to the public heart as this? Gentlemen, we may safely look forward to the day, and that in the very near future, when this Association will be the largest and most powerful scientific body in the United States, when questions of sanitation will become matters of education in our educational institutions, as they are in several in Germany, when the degrees will be conferred in sanitary science, and when a specially educated sanitary officer will become a recognized officer in every community in the United States.

It is true our city is small. Many in the Union exceed us in wealth, in population, in extent ; but though they may present to you more varied sights, offer you grander entertainment, show you larger and more magnificent public institutions, there is one thing at least in which we will not acknowledge that we are exceeded by any, and it is in the warmth, cordiality, genuineness of the welcome, which, on the part of the medical profession of Savannah, I have now the honor to tender to the American Public Health Association.



### III.

## BRIEF NOTICE OF THE RISE AND PROGRESS OF INTERNATIONAL HYGIENE.

By J. L. CABELL, M.D.,  
*Richmond, Va.*

I DESIRE, Mr. President, to express some views on the subject of international hygiene which have suggested themselves to my mind in connection with the incidents of the recent International Conference of Washington.

It will be remembered that this Association adopted at the Richmond meeting in October, 1878, a resolution to this effect: "That it is the duty of the General Government to invite foreign nations to co-operate with it in the establishment of uniform and effective international quarantine regulations." The National Board of Health, created by an Act of Congress approved March 3, 1879, did not overlook this expression of the wishes of the Association, to whose active exertions it owes its establishment; but after a thorough investigation of the subject, including repeated consultations with prominent officials in both the legislative and executive departments of the government, it became satisfied that the United States could not, under judicial decisions heretofore considered conclusive, become a party to any treaty binding the government to enforce international quarantine regulations. For while it may be conceded, and is, I believe, generally conceded, that the federal authority may prevent infected or suspected vessels from entering any of the ports of the United States, the General Government has never claimed the right of granting free *pratique* to vessels in opposition to the wishes of the local authorities, who are the proper guardians of the public health in their respective localities.

Necessarily restrained by this consideration from taking any further steps in the precise direction specified in the resolution just cited, the National Board of Health, in concert with the committee of the National Academy of Sciences, which was required by law to co-operate with the Board, sought to obtain some of the ends contemplated by the Association, by recommending the call of an International Sanitary Conference to consider other subjects of sanitary interest than such as related to quarantine regulations. It was finally decided to ask for a conference which should only be invited to consider the means of establishing an international system of notification as to the sanitary condition of ports and places, and of vessels sailing therefrom. In accordance with this recommendation, the two houses of Congress, by a joint resolution, directed the President of the United States to call such a conference to meet in Washington, to which the several powers having jurisdiction of ports likely to be infected with yellow fever or cholera should be invited to send

delegates. Twenty-three States, in addition to Canada and the United States, responded to this invitation; and the conference was opened on the 5th of January, 1881. The Final Act was signed March 1, when the conference was closed. When the protocols, which have been ordered to be printed, shall have become accessible to the public, it will be seen that the delegates of the United States felt themselves constrained to oppose, by argument and by their votes, any and every measure which, however praiseworthy in itself, might be liable to the construction of transcending the limits of discretion implied by the terms of the joint resolution of Congress. Among other propositions to which they objected on the ground that their incorporation among the recommendations of the conference would probably endanger the success of the main object by overloading it with impracticable conditions, were several schemes of international sanitary commissions for the attainment of special ends of more or less interest and utility. They thus found themselves in the somewhat equivocal position of opposing measures which they approved in the abstract, and the adoption of which, if faithfully carried out, would mark a great and beneficent advance in international hygiene. I am glad, therefore, to seize an opportunity of placing myself *rectus in curia* on this subject, before the leading sanitary association of our country.

It can scarcely be necessary to advance formal arguments to set forth the manifold advantages of international sanitary commissions as means of advancing sanitary knowledge and of widening the sphere of its applications. I assume that it will be conceded, that, in selecting means for securing international interests, it is a logical consequence that prominence should be given to international instrumentalities. Especially does this principle seem to be applicable to the scientific investigation of the laws of epidemics, and of the means of arresting their spread beyond the limits of the primary foci in which they originate, or of the secondary centres in which they may have been accidentally established. To realize all the benefit that may be derived from such investigations relating to epidemics which are capable of existing under wide diversities of climate and soil, with perhaps somewhat correspondent differences of manifestation, it would seem to be indispensable that there should be a central commission of competent experts to analyze and collate the various observations, and to harmonize apparent discrepancies. My object, therefore, is not so much to vindicate the policy of international sanitary commissions, since none will question their value, as it is to indicate the gradual steps by which the views of intelligent sanitarians have been tending to assume a definite shape with regard to the ends for which such international instrumentalities may be usefully employed. M. Proust, in his instructive "Essay on International Hygiene, with Special Reference to its Applications against the Plague, Yellow Fever, and Asiatic Cholera," takes the position that, until the meeting of the International Sanitary Conference of Paris in 1851-52, there had never been concert of action between the different governments of the world in regard to quarantine regulations, and that international hygiene was then for the first time formally recognized and established.

He cites facts to show that, prior to this period of international discussions, the history of restrictive measures exhibited two distinct stages, marked by opposite errors of great magnitude. When a destructive epidemic visits a country for the first time, the populations are seized with a feeling of superstitious terror, and are disposed to seek protection by measures of barbarous cruelty. By a natural re-action against such an evil, people often go to the opposite extreme, and declare all quarantines to be as useless in respect of sanitation as they are annoying and mischievous by obstructing commerce and interfering with the personal liberty of travellers. It must indeed be admitted that restrictive measures are often so practised as to be justly liable to this criticism. The utter failure of severe quarantines and sanitary cordons organized on a vast scale in Russia, Prussia, and other points in Central Europe, to prevent the spread of cholera in 1830, naturally aided the re-action which discredited all such measures, and for a time threatened to abolish quarantines entirely. But the period was approaching when more rational views were to prevail, when a proper discrimination was to be made between quarantine badly applied and a rational system of observation and inspection, with such judicious applications of restrictive measures as would inflict far less injury on commerce than would result from an invasion of infectious disease. This third period, upon which most civilized governments have now entered in regulating their systems of maritime sanitary police, Proust justly designates the scientific period. It already counts many triumphs of sanitary surveillance, and is destined to win many more.

France had already shown, some years before the meeting of the first International Sanitary Conference at Paris, that the resources of preventive medicine, in respect of the exclusion from its territories of epidemics of exotic origin, could be immensely increased in efficiency by the use of means applied in or near the places of their birth.

Thus, most decided reforms were effected in 1847 and in 1849, on which latter occasion the Minister of Commerce and Agriculture, in a report to the President of the Republic, made this statement:—

“The ordinance of 1847 very materially modified the sanitary code of our country. It not only reduced the duration of quarantines and abolished them under certain conditions, on arrivals from Turkey and Egypt, when these countries were free from any pestilential epidemic, but it also established (and it is this which gives to the Act a peculiar importance), upon rational data, the new system of precautionary measures which it prescribed. Up to that period the precautions which had been taken against the introduction of the plague were not based upon any scientific observations: mere arbitrariness had for a great length of time determined the duration of quarantines. . . . While science casts so much light respecting the incubation and other features of the plague, an idea not less fruitful of good for the cause of sanitary reform was originated at the same time. Hitherto all defensive measures against the invasion of the disease had been organized merely on the sea-coast. It was now deemed to be both more simple and more logical to



extend the surveillance over the countries themselves where the disease took its origin. *This was done by the nomination of resident physicians by our government in Turkey and in Egypt, to examine into the sanitary condition of those countries, and to fix the bills of health to be given to vessels on their departure*, — a measure that was the more useful as it provided for the more or less speedy introduction of important modifications into the *régime* of sanitary superintendence."

As already stated, these measures of a single government were soon followed by a suggestion of the same government of an International Conference which, in pursuance of this invitation, met in Paris in August, 1851, and which resulted in the International Treaty of May, 1853, between France, Portugal, and Sardinia.<sup>1</sup> But while it may be conceded that this was the first step taken with the distinct and avowed purpose of inaugurating a formal system of international hygiene, and that it owed its origin to the felt necessity for international co-operation to secure that completeness of protection against spreading epidemics which the action of isolated governments had failed to realize each for itself, it is nevertheless true that an important practical movement had been inaugurated in Egypt several years prior to the Conference of Paris, and that this movement involved the co-operation of the consular agents of the several European powers, with results of such a nature as to have a most important relation to the early history of international hygiene.

As early as 1831, Mehemet-Ali, the able and energetic ruler of Egypt, directed his attention to the importance of protecting the public health in his dominions by such measures of maritime sanitary administration as were then enforced by the governments of Europe. To this end he invoked the assistance of the body of European consuls in service at Alexandria. At the first

<sup>1</sup> In view of the common danger to all Europe of the introduction of the plague and cholera from the East, the Conference of Paris introduced into the convention, to be proposed to the several participating powers, "special provisions relative to Turkey," assigning to the Superior Council at Constantinople the superintendence and direction of the necessary measures of public hygiene and health, but at the same time requiring that the powers interested should be represented on the council by a number of delegates equal to that of the Ottoman functionaries, and that such delegates should have a voice in the deliberations. These delegates — to be selected as much as possible from professional men — were to be appointed by their respective governments.

Among the provisions relative to the East generally it was required that "the number of European doctors now appointed as medical officers in the East shall be increased to twenty-six," one of whom, with the title of central doctor, shall be stationed in each of the cities of Constantinople, Smyrna, Beirout, and Alexandria, the others to be distributed according to the plan annexed to the regulations. Their duties were prescribed to be: (1) to study, in relation to the public health, the climate, the diseases, and all the characteristics of the countries in which they were stationed; (2) to make tours of inspection in their respective districts as often as they might consider it advisable, — in Egypt as often as possible; (3) to communicate every thing relating to the public health to the central doctor of the district, the consular body, and, if need be, to the local authorities of the country twice a week in Turkey and every week in Egypt. In case of an epidemic or any other suspicious disease, as also in all extraordinary cases, the medical officer shall send without delay a special report to all the above-mentioned authorities, and to all the medical officers and consuls of

official meeting of this body, held in conformity with the expressed wish of the Viceroy, it was unanimously agreed that the consuls-general of the European powers should constitute an organization of public health, and should select annually five of their number to form a "Consular Commission of Health" under the presidency of one of its members, whose tenure of office should be one month, and who should be succeeded by the other members in regular rotation. The consul-general of France, selected as the first president, announced, in a paper read before the commission, and subsequently promulgated with the sanction and authority of the Viceroy, the motives which determined the latter to institute these measures of sanitary reform. In this "Note of the European Consuls" it was said,—

"His Highness the Viceroy, convinced of the advantages of every kind which would accrue to Egypt, in her political and commercial relations, from the establishment of lazarets and other sanitary institutions, such as Europe has enjoyed for so many years, has condescended of his own proper motion to invite the consuls of the European powers to indicate to him the measures to be taken in order to attain this end, and to submit to him a project for immediate execution."

In compliance with this request, the "Note" in question proceeded to specify in the first place the establishment of a maritime lazaret at Alexandria, which, as well as others that might be subsequently established by his Highness, should be organized and administered like those of Europe, adding, that, in order to assure and facilitate the organization of such establishments, the employés should be Europeans.

It was further added that a "Commission of Public Health," composed of

the neighboring districts, and, if necessary, to some doctors and consuls more distant, to whom such information might be useful.

It was further declared that these European doctors, appointed medical officers in the East, should be entirely independent of the local authorities, and only be responsible to the governments by which they were appointed.

The convention containing these provisions was signed by the representative of Turkey in the Conference of Paris, but was not ratified by the Turkish Government. Nevertheless, the Constantinople Board of Health (*Conseil Supérieur de Santé*) continued its operations under an organization nearly, if not quite, identical with that indicated in the articles of the convention, which organization had existed prior to the assembling of the conference. It had been "created by Sultan Mahmoud in 1840 for the special purpose of arresting the progress of the plague in Turkey. As restrictive measures were the means adopted to carry out the purpose, as funds were required to organize a staff to work with, and as the proposed measures were to be applied to persons and ships of every nationality, it became necessary, in consequence of the extra-territorial jurisdiction of foreigners in Turkey, to obtain the concurrence of all the foreign governments represented at the Porte. The Board of Health thus became a mixed commission composed of Ottoman members named by the Porte, and of foreign delegates appointed by the foreign powers. All sanitary questions and administrative matters concerning the health departments are discussed by the Board of Health, and resolved by a majority of the members present at the sitting. Such resolutions, however, require (except on great emergencies) the sanction of the Porte before they can be put in force."—*Dr. Dickson to the Right Hon. A. H. Layard, April 25, 1878, cited in Mr. Netten Radcliffe's Memorandum, etc.*

five members selected by the consuls of the European powers from among their own number, should be charged with the duty of sanitary administration as to current and daily transactions, except only when particular exigencies made it important to refer special questions to the entire consular body. The commission was to have exclusive authority in deciding as to the number of days of quarantine or of observation which should be exacted of vessels of all nationalities after the exhibition of their bills of health.

It thus appears from the terms of this "Note of the European Consuls," that, though this arrangement was originally suggested in the exclusive interests of the public health of Egypt, and had no reference to the protection of other countries, the employment of international agencies gave it *ab initio* an international character, which, in the sequel, asserted itself in so positive a manner as to imply the assumption of authority independent of the government which had created the commission. This, however, was effected by a somewhat gradual process. Thus in 1835 it was decided by the Consular Health Commission to substitute the office of a permanent head for that of a president changed every month, and this permanent officer was to be charged with the duty of directing the correspondence with the Egyptian Government and with the sanitary authorities of foreign countries concerning all that relates to international hygiene and to maritime quarantine. Two years later (August, 1837), at a meeting of the consular corps, attention was called to the disorders resulting from a new separation, under the special orders of the Viceroy, of the sanitary administration of Crete and Syria from that of Egypt; and the Consular Commission was instructed to represent to his Highness in the most energetic manner that it was expedient to centralize in the hands of the Consular Commission of Alexandria all power and all authority over the sanitary service of Crete and of the maritime provinces of the Levant under the jurisdiction of Egypt.

A year or two later, the government had occasion to request the Consular Sanitary Commission to dismiss one of its employés, who had made use of offensive expressions towards the government in an official report. This request was at first evaded; and, on a second and more peremptory demand by the Minister of Foreign Affairs and of Commerce, it was formally refused, the consular corps declaring, that, while it recognized the right of the government to approve or disapprove the nomination of the sanitary agents, it could not concede its right to dismiss them. This and some other incidents which threatened to give rise to unpleasant complications and dissensions between the local government and the consular agents of foreign powers, were met by a measure on the part of the government which might have been anticipated, although it appears to have taken the consular body by surprise. The Minister of Foreign Affairs, in a note addressed to the presiding officer of the consular commission, informed that body that his Highness the Viceroy was convinced that the sanitary administration, organized in his dominions with the generous assistance of the consuls of the European powers, could now be carried on by the local government itself, upon which rested naturally the direction of sani-



tary affairs for the benefit of the populations subject to its jurisdiction. It was, therefore, with great pleasure that his Highness found himself enabled to relieve the consular body from the gratuitous labors incidental to the sanitary service. His thanks were due, and were cordially given, to the consular agents for the aid and co-operation hitherto extended to the government; and they were assured that the new health board, to be immediately created, would follow the ways already established in respect of the relations of Egypt and its dependencies with foreign states. It was also stated that this board, under the presidency of the Secretary of State for Foreign Affairs and Commerce, would be composed of seven members, one of whom would be a special agent of the government, and the other six were to be selected from among the notable merchants, native and foreign, residing at Alexandria.

An order to this effect, announcing the names of the seven members, was promulgated on the 1st of January, 1840, and elicited, on the 4th of the same month, a formal protest on the part of the consular body, in which it was declared that they could not recognize the measure which the government had just taken, and that in no case would they consent to admit the authority of a sanitary board in which their body was not represented.<sup>1</sup> Nevertheless, Mehemet-Ali, who, by recent victories, had reached the culminating point of his power, disregarded for a time the protest of the foreign powers; but in 1843, owing to their continued refusal to recognize the authority of the new sanitary board, he was constrained to concede to them a certain participation in the deliberations touching questions of quarantine. Accordingly he consented that a delegate, representing each of the consuls of Austria, France, Great Britain, Greece, Prussia, Russia, and Sardinia, should be admitted to all the deliberations of a new board of health, but without the right of voting. This board continued to perform its functions with more or less satisfactory results during the remnant of the life of Mehemet-Ali, and during the brief reigns of his immediate successors, Ibrahim-Pacha and Abbas-Pacha.

Within this period several of the European governments sent sanitary commissions to investigate the manner in which quarantine administration was conducted by the Egyptian authorities. These commissions bore very favorable testimony to the fidelity with which quarantine regulations were enforced. Similar testimony was repeated in emphatic terms at the International Sanitary Conference of Paris by the Austrian and Turkish commissioners.

In 1865 Asiatic cholera was introduced into Europe by way of the Red Sea for the first time. The severity of the epidemic led to the adoption of quarantine measures by different states without concert, and without any well-digested system of regulations. The resulting injury to commercial interests suggested the idea of a diplomatic and medical conference to consider the

<sup>1</sup> For this and other statements of facts relating to the history of the sanitary administration of Egypt, the author of this paper is indebted to an admirable "*Aperçu historique de l'Organisation de l'Intendance Générale Sanitaire d'Égypte séant à Alexandrie depuis sa fondation en 1831, sous le règne du Grand Vice-Roi Méhémet-Aly jusqu' à la fin du règne du Khédive Ismail en 1879. Par le Dr. Néroutsos-Bey.*"

means of preventing the recurrence of such sanitary and commercial disasters. Here, as before in 1850, France led the way, and suggested the Conference of Constantinople, which was opened in that city in February, 1866, and continued its sessions for about seven months. During this prolonged session the subject of cholera as an imported epidemic was exhaustively considered in all the aspects which relate directly or indirectly to practical measures of prevention, such as the questions relating to the origin and place of birth of cholera, its endemicity and epidemicity in India, those relating to its transmissibility, and the conditions of its propagation, and especially the questions touching the danger of the importation of the disease by pilgrims returning from Mecca. In this latter connection it was decided to establish, under international auspices, posts of observation on the shores of the Red Sea, to be occupied by competent sanitary physicians selected for the purpose. It was also required to establish lazarets at two separate stations, and to organize an international commission to sit at Suez, which should decide all questions concerning the sanitary service of the Red Sea.

While these measures of a formally recognized International Sanitary Service were being put into execution, the Sanitary Council of Egypt itself underwent a progressive change which gave it more and more of an international character. It had now come to have only four or five representatives of its own government, while there were twelve delegates of foreign powers; but it should not be forgotten, that, long before the European powers had taken any steps looking to international co-operation, the great Viceroy of Egypt had taken the initiative in the practical application of international hygiene by a system which was already in beneficent operation when France proposed the Conference of Paris in 1850, and which continued without change after the adoption by France, Portugal, and Sardinia of a convention based upon the conclusions of that conference.

Some of the foregoing facts serve to show how many practical difficulties environ every attempt to secure efficient international co-operation in the execution and enforcement of sanitary regulations by international agencies operating within the jurisdiction of an independent state, even when the right to exercise such international authority has been conceded by the territorial government.

There are, however, other functions which may be assigned to an international sanitary commission without incurring the risk of wounding national susceptibilities. Thus the Sanitary Conference of Vienna recommended a plan of sanitary work, with a view to the scientific investigation of the causes of cholera, and the means of combating them, by an international commission of experts in sanitary science.

This conference was the result of the re-appearance of cholera in Turkey, whence it spread over Europe from 1871 to 1873. It deserves notice, that, though the disease appeared simultaneously in Turkey and in the Hedjaz, its introduction by way of the Red Sea was effectually prevented by the measures put into operation in accordance with the recommendations of the

Conference of Constantinople in 1866. The appearance of the disease in Alexandria was traceable to an importation *from Europe*, and not from the Red Sea.

The Vienna Conference was opened on July 1, 1874, and closed its sessions on the 1st of August. With one or two exceptions, applying exclusively to the delegation of Austria-Hungary, the *personnel* of the conference consisted of medical men representing nineteen European states, and the governments of Egypt and Persia. After adopting conclusions<sup>1</sup> nearly identical with those of the Conference of Constantinople, and expressing a desire that a penal code applicable to violations of sanitary laws should be promulgated in the Ottoman Empire, the Vienna Conference voted a project for the creation of a permanent international commission, with a view to the scientific study of epidemic diseases. It was prescribed by the second article of the project that the duties of the commission should be purely scientific, and that, while not excluding other epidemic diseases, its principal task should be the study of cholera with respect to etiology and prophylaxis. The same article assigns

<sup>1</sup> The "first part" of these conclusions relates to scientific questions as follows:—

I. "Asiatic cholera has its origin in India, and its appearance in other countries is always the result of importation. It does not become endemic in any other country." *Adopted unanimously.*

II. Questions relating to the transmissibility of cholera.

(1) Transmissibility by man.

"The conference accepts the fact of the transmissibility of cholera by human beings coming from an infected locality. It does not consider that man can become the specific cause, except under the influence of an infected medium; but he may be the means of propagating cholera when he comes from a place in which the germ already exists." *Unanimously adopted.*

(2) "Cholera may be transmitted by clothing carried from an infected locality, and especially by such as had been worn by persons suffering from the disease. It further appears that the disease may be conveyed to great distances by clothing kept in closed boxes, and not exposed to the air." *Unanimously adopted.*

(3) Transmissibility by food and drinks.

(a) "As to food, the conference, not having positive proof, abstains from pronouncing a decision." *Ayes, 11; noes, 7.*

(b) "Cholera may be propagated by drinks, especially by water." *Unanimously adopted.*

(4) Transmissibility by animals.

"There is no positive proof of the transmission of cholera from animals to man, but it is rational to admit the possibility of such transmission." *Ayes, 10; noes, 2. Abstained from voting, 6.*

(5) Transmissibility by merchandise.

"While unanimously recognizing the absence of proof in support of the transmission of cholera by merchandise, the conference admits the possibility of the fact under certain conditions." *Ayes, 13. Abstained from voting, 5.*

(6) Transmissibility by the cadaver of a person dead of cholera.

"Although such transmission has not been conclusively proved, it is prudent to consider this as a source of danger." *Unanimously adopted.*

(7) Transmissibility by the atmosphere alone.

"There is absolutely not a single fact which would go to prove that cholera can be propagated to a distance by the atmosphere alone, whatever may be its condition. Moreover, it is a law without exception that no epidemic has ever passed from one locality to



to the commission the duty of calling international sanitary conferences when considered to be expedient, and to prepare the programmes for such conferences. By the third article it is required that the commission shall be composed of medical delegates appointed by the participating governments, and that there should be at Vienna a fixed bureau charged with the duty of centralizing the work, and carrying into execution the deliberations of the general commission. The fourth article refers to the mode of raising the funds necessary for defraying the expenses of the commission by an assessment on the different states, to be regulated by diplomatic arrangement. The fifth article prescribes the establishment of temporary missions or of fixed sanitary posts under the direction of resident physicians in those countries which do not have an organized sanitary service. And finally, in an "additional article," the desire is expressed that an International Council of Health, similar to those of Constantinople and Alexandria, might be established in Persia, both to ameliorate the sanitary condition of that country, and, at the same time, to

another in a shorter time than would have sufficed for the transportation of human beings.

"The surrounding air is the principal vehicle of the cholera-poison; but its capacity to transmit the disease is, in the immense majority of cases, limited to a very short distance from the focus of emission.

"The alleged instances of its transportation by the atmosphere over a distance of one or more miles are not sufficiently attested." *Unanimously adopted.*

(8) Influence of the air on the transmissibility of cholera.

"In the open air the cholera-poison rapidly loses its morbid activity, as a general rule; but, under certain special conditions of close confinement, its activity may be preserved during an indefinite time.

"Great deserts are an effective barrier against the propagation of cholera. There has been no example of its importation into Egypt or Syria, across the desert, by caravans from Mecca." *Unanimously adopted.*

III. Duration of the period of incubation.

"In almost all cases the period of incubation, from the date of exposure to the commencement of the premonitory diarrhœa, does not exceed a few days. All the alleged instances of a more prolonged incubation are inconclusive, either because the premonitory diarrhœa was included in the incubative period, or because the actual contamination may have occurred after departure from the infected locality.

"Observations prove that the premonitory choleraic diarrhœa, which must not be confounded with all the diarrhœas which exist in the time of a cholera epidemic, does not last over a few days. The alleged exceptional cases have not been proved to be truly choleraic, and to be susceptible of transmitting the disease." *Ayes, 13; no, 1. Abstained from voting, 4.*

IV. Questions relating to disinfection.

(1) "Are there any known means or processes of disinfection by which the cholera-poison may be *certainly* destroyed, or be shorn of its intensity?" *Noes, 12. Abstained from voting, 7.*

(2) "Are there any known means by which it may be *probably* destroyed or weakened in intensity?" *Ayes, 13; noes, 5.*

(3) "As there are no certain and specific means of disinfection known to science, the conference recognizes the great value of such hygienic measures as aëration, thorough washings and cleansing, etc., combined with the use of agents actually possessing disinfectant properties." *Adopted unanimously.*

serve as a potential means of preventing the invasion of Europe by epidemics from that quarter.

Notwithstanding the unanimous recommendation by the conference, the International Commission, with duties thus outlined, has never yet been established.

The next effort to secure international co-operation in regard to the prevention of the spread of contagious and infectious diseases, was the conference at Washington, to which allusion was made in the opening of this paper.<sup>1</sup>

This conference, looking beyond the specific ends contemplated by the joint resolution of Congress, recommended the appointment of two distinct international commissions, one of which was, indeed, to be charged with the duty of collecting information from all parts of the globe, and of notifying to the several governments the existence of contagious or infectious diseases wherever they might appear. It is referred to in the fourth resolution of the Final Act of the conference in these terms : —

“A centralized international system of sanitary notification being deemed indispensable to the successful carrying out of the measures for preventing the introduction of disease, it is advisable to create international organizations to be charged with the duty of collecting information in regard to the outbreak, spread, and disappearance of cholera, yellow fever, the plague, etc., and of conveying such information to the parties interested.”

In the draft of a convention to carry out the objects of this plan, it is prescribed that there shall be established in Vienna and Havana a permanent International Sanitary Agency of Notification, — the former to gather sanitary information from Europe, Asia, and Africa ; the other agency, at Havana, to extend its sphere of action to the American continent and the islands belonging geographically thereto.

The details of this plan show it to be, both cumbrous and costly : and, believing that its incorporation in the Final Act as the basis of a future convention between the several powers would endanger the success of the whole enterprise, the delegates of the United States opposed its adoption with much earnestness ; but they were outvoted.

The other proposition, relating to the appointment of an international commission, is found in the eighth article of the Final Act, by which it was decided that a temporary and scientific commission shall be created by the nations most interested in protecting themselves against yellow fever, and by such others as may wish to take part in this arrangement, to be charged with the duty of studying all matters pertaining to the origin, development, and propagation of that disease.

This proposition — so similar in its purpose to an early effort made by the National Board of Health to investigate the causes and nature of yellow fever

<sup>1</sup> This statement seems to require qualification. The International Congress of Hygiene at Brussels in 1875 had adopted a *projet*, proposed by Dr. Thomas Belval, for a general organization of public hygiene, including both a national and international organization. A short notice of this scheme will be given farther on in this paper.

in its principal endemic focus (namely, Havana) by means of a temporary scientific commission appointed by itself, but aided to some extent by an auxiliary commission nominated by the Governor-General of Cuba — received the cordial assent of the American delegates. They concurred also in the draft of a convention to carry out this object ; which draft contains, among other provisions, the following items of inquiry : —

“*A.* The study and determination of the principal and permanent centres of the pathogenic germs of the disease.

“*B.* The conditions which favor its development as well as the causes and circumstances which aid its propagation in these centres, and its transmission into other countries.

“*C.* The means to be employed in order the more and more to circumscribe its effects, or even to eradicate the disease entirely from the regions in which it originates, and from the secondary centres of invasion.

“*D.* The surest means of preventing its transmission by vessels at sea.

“*E.* The best and most practical methods of disinfection of ships, their cargoes and passengers.

“*F.* Every thing which relates to the prophylaxis and treatment of the disease.”

A proposition for a scientific commission with the same ulterior object as the plan just cited, but largely amplified in the sphere and scope of its operations, was submitted by the special delegate of Portugal, and, although not adopted by the conference as a part of its conclusions, was permitted to be published along with the Final Act, as an appendix to the same, and was signed by all the medical and some other special delegates. This proposition recommends the creation of twenty-two international sanitary posts for the study of yellow fever, in each of which there should be at least two physicians, — one belonging to the country, the other to some of the countries with which the post or place has the largest commerce. All other nations will have the right to send sanitary physicians to these posts. The posts should be provided with all the instruments necessary for a thorough scientific investigation of the disease, such as microscopes, chemical apparatus, instruments for determining meteorological conditions, etc.

Monthly reports are to be transmitted to the governments which have appointed these sanitary agents, as also an annual report in duplicate, of which one copy shall be transmitted to the appointing governments, and the other presented to the Conference of Sanitary Physicians, which shall be held once a year in different places in rotation.

I apprehend that this scheme, so comprehensive and complete, will be regarded as too complex and expensive to meet with much favor from other than medical men.

After the conference had, by a small majority, voted a proposition offered by the delegate of Italy, but not approved by the delegates of the United States, a compromise measure, suggested by the French minister, was permitted to be inserted in the Final Act, as the report of a minority, and was signed by the delegates of Belgium, France, Russia, Turkey, and the United States.



The propositions of this minority scheme are as follows : —

“ 1. In those countries where the regulations provide that vessels should be furnished at the moment of departure with a bill of health, delivered by the local authorities, this bill of health shall continue to be delivered by those authorities ; but the captain of the vessel is at liberty to have said bill of health *visé* by the consul of the country of destination, who will be obliged to give it with the least possible delay. The consul shall have the right to add to his *visé* any observation he may judge necessary.

“ If the vessel is not obliged to take a bill of health from the local authorities, the captain can ask for one from the consul of the country of destination, who shall be obliged to deliver said bill to him with the least possible delay.

“ 2. In those countries the regulations of which require that the vessels, before obtaining a bill of health from the local authority, should be submitted to a sanitary inspection, the consul of the country of destination or his delegate shall always, at the demand of the captain, assist at this inspection.

“ If the vessel is not required to have a bill of health, to be delivered by the local authority, the consul from whom the captain shall ask for this bill of health, or his delegate, can make that inspection in conformity with rules to be established by common agreement between the respective governments ; but, in such cases, the inspections shall be made in concert with the consul of the country of the nationality of the vessel.”

In offering these propositions, M. Outrey spoke as follows : —

“ At the last meeting, the conference adopted, by a majority of four votes, a proposition relating to bills of health and the inspections of vessels ; and no one, of course, would think of reconsidering this vote : but some of us have remarked with regret that the vote showed that the powers most interested in establishing an agreement with their immediate neighbors were not of the same opinion on these two important questions. These observations, it is hardly necessary for me to say, apply more particularly to the United States and Spain ; and all must understand that the principal object of this conference cannot be attained by the adoption of any international agreement to which these two countries, and the States bordering on the Gulf of Mexico, whose maritime communications are so frequent, cannot accede.

“ The question of protection against epidemical disease applies more especially to the coasts of the United States, Cuba, and Mexico, which are so near each other ; and it is in regard to them that the greatest precautions will have to be taken. These considerations have induced some of us to see if we cannot find a new formula which would attain the object which the United States had in view in calling this conference. There can be, in our opinion, a medium between the American proposition, which is to take away from the territorial authority of the port of departure all right of intervention in what relates to the bill of health and to the inspection, and that proposition of the delegate of Italy, which declares in an absolute manner that this bill is to be delivered by this authority. Some of my colleagues and myself have hoped to solve the difficulty by submitting a proposition to which, I am happy to say, the delegates

of the United States have given their consent. It is in the name of my colleagues of the United States, Russia, Turkey, and Belgium, and in my own name, that I ask the conference to permit the insertion in the protocol of a new proposition, which will be considered the expression of the views of the minority. We would be well pleased should this proposition serve as the basis of agreement between the different States, the territories of which are often threatened by epidemic diseases."

At first view, it might be considered that but little was gained by leaving it to the discretion of the captain whether to obtain the *visé* of the consul of the country of destination; but a little reflection will suffice to show that inasmuch as the captain will find it necessary to put himself in accord with the authorities of the port of destination, the apparent discretion is really tantamount to an obligation, in all those cases at least in which the consular indorsement will be required by these authorities, as, for example, it is required for the ports of this country by an Act of Congress.

When the proposition of M. Outrey had been read, the delegate of Spain (M. de Vigo) stated, "that although he approved the proposition of the delegate of Italy, for which he had voted, and to which he had added an amendment, he would nevertheless be willing to submit to the consideration of his government the proposition of the delegates of the United States, Belgium, France, Russia, and Turkey, which had just been presented. He added that his government had always wished to entertain cordial intercourse with the United States and other powers; and he hoped, therefore, that his government would look favorably upon a proposition thus presented in a spirit of compromise, in order that an understanding between the powers interested may be arrived at."

We need only fix our attention upon a few of the salient points in the foregoing narrative to recognize distinct evidences of a gradual and progressive advance of international hygiene throughout the entire period included in the narrative. Compare, for example, the elaborate code of international quarantine regulations forming the articles of a convention which grew out of the deliberations of the International Sanitary Conference of Paris, — a convention ratified by only three of the twelve participating powers, and quietly dropped by these three at the end of the first five years, with the practical and beneficent reforms in the organization of the sanitary service of the East achieved by the Conference of Constantinople in 1866, — and one cannot but be struck with the definiteness of purpose and the judicious adaptation of means to ends which characterize the conclusions of the later conference as compared with its predecessor.

With still greater emphasis may this be said of the admirable discussions of a later international sanitary conference which was held at Vienna in 1874, discussions in which we note the distinguished names of Pettenkofer, Hirsch, Sigmund, Fauvel, Proust, Dickson, Seaton, Semmola, and others, as earnest participants. It is true that the recommendation of a permanent sanitary commission, adopted with great enthusiasm and by a nearly unanimous vote,

has not been carried out; but this fact is probably explained, in part, at least, by political complications which occurred shortly after the adjournment of the conference.<sup>1</sup>

Warned, however, by the results of experience, our own government, in calling the new sanitary conference at Washington, had a more modest aim, and, recognizing the essentially local character of quarantine, expressly disavowed any purpose of desiring to establish a system of international quarantine regulations. It aimed only to secure an international agreement as to the means of obtaining accurate and trustworthy information concerning the sanitary condition of foreign ports at which infectious diseases were likely to exist, and of the vessels sailing therefrom to the ports of other countries, leaving each nation to carry out its own sanitary regulations. Its delegates, though outvoted on some points of detail, were successful in obtaining a general recognition of the principle for which they contended, that the accredited agents of each government should have facilities for verifying the statements which would be contained in the bill of health delivered by the local authorities of foreign ports, and *viséd* by its own agents. They were successful, too, in obtaining the adoption by the conference of a form of bill of health submitted by themselves, which form requires the authority which delivers it to furnish the most precise and detailed information as to the sanitary condition of the port and the surrounding country, and of the vessel, its cargo, passengers, and crews, — all this, too, not in general terms, but under specified heads so numerous and so particular as to make it almost impossible to mislead the authorities of the port of arrival, except by wilful misrepresentation and fraud on the part of those who furnish the bill.

Here, too, we note progress; and if an international treaty should be formed on the basis of the resolutions which constitute the Final Act of the Conference of Washington, including the proposition for the creation of a temporary international scientific sanitary commission for the study of yellow fever

<sup>1</sup> As exemplifying the gradual advance of doctrine on a sanitary question of the utmost importance, obtained, in part, at least, by means of discussions in International Sanitary Conferences, the reader is referred to the successive changes of opinion on the subject of the dissemination of cholera as lucidly stated in a Memorandum by Mr. Netten Radcliffe on Quarantine in the Red Sea, and on the Sanitary Regulation of the Pilgrimage to Mecca in a supplement to the Ninth Annual Report of the Local Government Board, 1879-80, pp. 129-135.

In further illustration of the asserted progress in practical international hygiene, we may refer to the action of the conferences of Constantinople and Vienna in regard to pilgrims. Thus "the International Sanitary Conference of 1866 held that pilgrims and pilgrim-ships must be subjected to special sanitary regulations; and the Conference of Vienna (1874) excluded pilgrim-ships from their general suggestions as to quarantine, on account of the peculiar dangers which presumably attached to them, and relegated to the authorities of the ports where they put in or touched at, the duty of taking such precautions as the latter thought fit. This suggested exemption of pilgrim-ships from the ordinary rules of quarantine must be had in mind. It appears to be inseparable from the nature of the pilgrim traffic; and Egypt, in carrying out such regulations as she thinks best with regard to this traffic in her own ports, and Turkey also in her ports, are acting in full accord with the conclusions of the conferences of both 1866 and 1874." — *Mr. Netten Radcliffe, loc. cit.*



in the places of its endemicity and epidemicity, the work of that conference will mark a notable epoch in the history of international hygiene.

An effort was made by Mr. Edward Sève, delegate of Belgium, to procure the indorsement by the conference of a proposed general organization of public hygiene, which had been successively adopted by the International Congress of Brussels in 1875, and that of Amsterdam in 1879. The scheme in question included both a National and an International Organization, and both were very comprehensive and complete. But the conference refused to order the insertion of this plan of General Sanitary Organization in an appendix to its Final Act, partly because it was foreign to the special object for which the conference had been called, and partly because Mr. Sève's motion for such insertion was made at a late hour of the last session of the conference, when its adoption would have been claimed as a precedent for similar motions by some other delegates. The plan was, however, ordered to be printed in full in the protocol of that day's session. I cite that part which relates to the International Organization, which was to comprise, —

"1. The frequent and regular exchange of communications between the superior sanitary boards of the various countries. These communications would bear principally, —

"*A. a.* Upon the means used to improve the sanitary conditions of the various localities and of their population ;

"*b.* Upon the hygienic measures adopted with a view to mitigating the effects of endemic diseases ;

"*c.* Upon the precautions adopted for the purpose of preventing the importation of epidemic or contagious diseases ;

"*d.* Upon the appearance of foci of endemic diseases ;

"*e.* Upon measures adopted to combat epizootics.

"*B.* Upon the results obtained in each of these cases.

"*C.* Upon the statistical data collected or to be collected with a view to elucidating the problems of public hygiene.

"2. The periodical meeting of International Sanitary Conferences."

Although, for the reasons stated, the Conference of Washington did not especially indorse this plan, I consider the adoption of its principles by two successive International Congresses in Europe an evidence of a growing tendency on the part of the leading sanitarians of the civilized world to recognize the need and the value of an organized system of international hygiene.

## SOME REMARKS UPON NATIONAL AND INTERNATIONAL SANITARY JURISPRUDENCE.

By T. J. TURNER, M.D., U.S.N.

"The application of a rule to various subjects can no otherwise be made but in a manner agreeable to the nature of the subject; whence there results a natural law of nations as a particular science, consisting in a just and rational application of the law of nature to the affairs and conduct of nations and sovereign princes." — VATTTEL.

I DESIRE to expressly state at the outset that the views hereinafter presented must be considered entirely from the stand-point of preventive medicine.

The Act of March 3, 1879, introduced by the Hon. J. H. McGowan of Michigan, established in the United States, for the first time in its political history, a National Board of Health. This Act detailed the method of its organization, and, in a general way, assigned certain functions to the Board. (Appendix I.)

The Act of June 2, 1879, introduced by the Hon. Isham G. Harris of Tennessee, added other duties to those already assigned; and it is proposed to consider certain of these duties in their relations to both National and International Sanitary Jurisprudence. (Appendix II.)

This latter Act, that of June 2, 1879, is known as the "Quarantine Act," and has its foundation in art. I., sect. 8, of the Constitution of the United States, which reads as follows: —

"The Congress shall have power . . . to regulate commerce with foreign nations, and among the several States, and with the Indian tribes."

The learned Justice Story, in his commentaries on the Constitution, especially upon this section of art. I., states, "In the first place, then, what is the constitutional meaning of the words, 'to regulate commerce'?" for the Constitution being (as has been aptly said) one of enumeration and not of definition, it becomes necessary, in order to ascertain the extent of the power, to ascertain the meaning of the words. The power is to regulate; that is, to prescribe the rule by which commerce is to be governed. The subject to be regulated is commerce. Is that limited to traffic, to buying and selling, or the interchange of commodities? Or does it comprehend navigation and intercourse? . . . Commerce undoubtedly is traffic; but it is something more, — *it is intercourse*. It describes the commercial intercourse between nations *and parts of nations in all its branches, and is regulated by prescribing rules for carrying on that intercourse*." He further states that there are acknowledged powers of the States over certain subjects having a connection with commerce, and remarks, "These powers are entirely distinct in their nature from that to

regulate commerce ; and, though the same means may be resorted to for the purpose of carrying these powers into effect, this by no means furnishes any ground to assert that they are identical. Among these are inspection laws, *health laws*, laws regulating turnpikes, roads, and ferries ; all of which, when exercised by a State, are legitimate, arising from the general powers belonging to it, unless so far as they conflict with the power delegated to Congress. They are not so much regulations of commerce as *police*, and may truly be said to belong, if at all, to commerce, to that which is *purely internal*." Justice Story also, in commenting upon the extent, objects, and purposes to which the constitutional powers of the General Government may be applied among States, says that it "extends to quarantine laws ;" but upon such subjects his editor (Cooley) says, "The power is not exclusive."

The Hon. J. R. Tucker, member of Congress of Virginia, in his letter of Nov. 19, 1878, to Dr. J. L. Cabell, recites, "that Congress should sustain the health laws of the States, and may make provisions in aid of them, but not against them, or contrary to their purpose." He also further states, "Congress, by limiting *commercial privileges* by its own rules, which will prevent the ingress or spread of disease, and respecting the health regulations of each State, will do all for commerce it should do consistently with the welfare of the people. . . . I confess I can see no constitutional difficulty to the adoption of a system of commercial and health laws in perfect harmony with each other, made legal by the sanction of the Federal and State Governments."

It is not seen how the first part of the quotation can apply without conflict of authority ; for instances are too well known of the establishment of health laws for quarantine purposes by the ports of one State against ports of another State, ostensibly for the purpose set forth, but in reality aimed at securing for themselves each other's commercial interests. It is not likely that Congress would sustain or make provisions in aid of such laws, especially when paragraph 6, sect. 9, art. I. of the Constitution, — "No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another," — is considered in such relations.

It may not be out of place here to refer to the opinion of Chief Justice Marshall in the case of *Gibbons v. Ogden*, delivered in 1824, and which is so frequently quoted as bearing upon the matters under consideration, and either directly or indirectly bearing upon the duties and responsibilities of the National Board of Health, founded, as it is at present, upon that part of the Constitution of the United States "to regulate commerce : " —

"The genius and character of the whole government seem to be, that its action is to be applied to all the external concerns of the nation, and to those external concerns which affect the States generally, but not to those which are completely within a particular State, which do not affect the other States, and with which it is necessary to interfere, for the purpose of executing some of the general powers of the government. The completely internal commerce of a State, then, may be considered as reserved to the State itself. But, in regulating commerce with foreign nations, the power of Congress does not



stop at the jurisdictional lines of the several States. It would be a very useless power if it could not pass these lines. The commerce of the United States with foreign nations is that of the whole United States. Every district has a right to participate in it. The deep streams which penetrate our country in every direction pass through the interior of almost every State in the Union, and furnish the means of exercising this right. If Congress has the power to regulate it, that power must be exercised wherever the subject exists. If it exists within the States, if a foreign voyage may commence or terminate at a port within a State, then the power of Congress may be exercised within a State. This principle is, if possible, still more clear, when applied to commerce 'among the several States.' They either join each other, in which case they are separated by a mathematical line; or they are remote from each other, in which case other States lie between them. . . . The power of Congress, then, whatever it may be, must be exercised within the territorial jurisdiction of the several States. . . . We are now arrived at the inquiry, What is this power? It is the power to regulate—that is, to prescribe—the rule by which commerce is governed. This power, like all others vested in Congress, is complete in itself, may be exercised to its utmost extent, and acknowledges no limitation, other than are prescribed by the Constitution. . . . If, as has always been understood, the sovereignty of Congress, though limited to specified objects, is plenary as to those objects, the power over commerce with foreign nations and among the several States is vested in Congress as absolutely as it would be in a single government having in its constitution the same restrictions on the exercise of the power as are found in the Constitution of the United States."

Again, in the same case, the chief justice remarks, in alluding to inspection laws, etc.,—

"They form a portion of that immense mass of legislation which embraces every thing within the territory of a State not surrendered to a General Government; all which can be most advantageously exercised by the States themselves. Inspection laws, *quarantine laws, health laws of every description*, as well as laws for regulating the internal commerce of a State, and those which respect turnpikes, roads, ferries, etc., are component parts of this mass. No direct general power over these objects is granted to Congress, and consequently they remain subject to State legislation. If the legislative power of the Union can reach them, it must be for national purposes, it must be where the power is expressly given for a special purpose, or is clearly incidental to some power which is expressly given. It is obvious that the government of the Union, in the exercise of its express powers (that, for example, of regulating commerce with foreign nations and among the States), may use the means that also may be employed by a State in the exercise of its acknowledged powers (that, for example, of regulating commerce within the State). . . . The Acts of Congress passed in 1796 and 1799 (Appendix III.), empowering and directing the officers of the General Government to conform to and assist in the execution of the quarantine and health laws of a State, proceed, it is said, upon the idea that these laws are constitutional. It is undoubtedly true that they do

proceed upon that idea ; and the constitutionality of such laws has never, so far as we are informed, been denied. But they do not imply that a State may rightfully regulate commerce with foreign nations or among the States ; for they do not imply that such laws are an exercise of that power, or enacted with a view to it. On the contrary, they are treated as quarantine health laws, are so denominated in the Acts of Congress, and are considered as flowing from the acknowledged power of a State to provide for the health of its citizens. But it was apparent that some of its provisions, made for this purpose and in virtue of this power, might interfere with and be affected by the laws of the United States, made for the regulation of commerce. Congress, in that spirit of harmony and conciliation which ought always to characterize the conduct of governments standing in the relation which that of the Union and those of the several States bear to each other, has directed its officers to aid in the execution of these laws, and has, in some measure, adapted its own legislation to this object by making provisions in aid of those of the States. But, in making these provisions, the opinion is unequivocally manifested that Congress may control the State laws so far as it may be necessary to control them for the regulation of commerce."

Justice Grier gives the following opinion as a definition of the police power of the States: "It may safely be affirmed that every law for the restraint and punishment of crime, *for the preservation of the public health, peace, and morals*, must come within this category. . . . The exigencies of the social compact require that such laws be executed before and above all others. . . . It is for this reason that quarantine laws, which protect the public health, compel mere commercial regulations to submit to their control. They restrain the liberty of the passengers, they operate on the ship, which is an instrument of commerce, and its officers and crew, the agents of navigation. They seize the infected cargo, and cast it overboard. The soldiers and sailors, though in the services of the government, are arrested and imprisoned and punished for offences against society. Paupers and convicts are refused admission into the country. All these things are done, not from any power which the States assume to regulate commerce, or to interfere with the regulations of Congress, but because *police laws for the preservation of health*, prevention of crime, and the protection of the public welfare, must of necessity have full and free operation, according to the exigency which requires their interference."

It appears evident from these rulings applied to quarantine and health laws, that each State has a reserved right to legislate upon such matters *within* its territorial jurisdiction, and no farther,—this I have chosen to term *intra-state* quarantine. It is also evident that *interstate* quarantine, *between and among* the States, belonging to no State in particular, is within the competent jurisdiction of the General Government, and also that Congress has the power of assuming the control and conduct of the entire subject in all its relations, for national purposes, whenever in its judgment such conduct and control is necessary.

It is a well-established fact that certain articles of commerce, of traffic, are the carriers of disease-poisons, if not entering themselves as prime factors in their causation under certain conditions; and it is known also that even the means used for carriage or transportation, — ships, cars, etc., — independent of their contained freights and the act of carriage, are more or less suspected, according to the evidence existing at the time, to be the source of such disease-movements. Now, the Act of June 2, 1879, aims to attain exemption from portable disease-poisons being so carried, by securing *the best sanitary condition of vessel, cargo, passengers, and crew*. How are these disease-poisons and diseases introduced? By the intercourse of *persons* and the carriage of *things*. The diseases specially noted by the National Board of Health, for the purpose of the Act, as being introduced, are yellow fever, small-pox, cholera, and plague.

Whatever may be stated as the characteristics of the yellow-fever poison, it is known as a practical fact, needing no demonstration here, that it is carried by ships, perhaps, as some assert, originating in them under certain conditions; and it is also known to attach itself to many articles that can be and are carried from place to place, notably, to cite a very frequent instance, in woollen goods, such as clothing, blankets, etc. So far as to *things* as the carriers of pestilential disease-poison. Now, as to *persons*. There is no hazard of contradiction from any student of the history of medicine, still less from any student of preventive medicine, when his attention is directed to the fact, that the crowding together of fever-patients gives rise to what was known to the early medical writers of this century as an “idio-miasm,” an animal poison, reproducing its like in persons previously unaffected coming within the range of its influence. To discuss this matter in all its relations would lead me into the subject of hospitalism, — in fact into the consideration of the causation of all the ochletic diseases. It certainly does not become me here to apply the like reasoning to variola, typhus, or the plague, or, with immaterial modifications, to cholera. The names being changed, the application is the same. Upon these correctly received ideas, and the known fact of the portability of the unknown factors in the production of disease-movement, is, as I have hinted, the present legislation based. In accepting Justice Story’s definitions, I trust to be permitted to state, from a sanitary stand-point, that this legislation is a regulation of commerce, and also an act of national sanitary police, and to that extent removed from State interference.

Sect. 4794 of the Revised Statutes reads, “That there shall be purchased or erected, under the orders of the President, suitable warehouses, with wharves and enclosures, where merchandise may be unladen and deposited from any vessel which shall be subject to a quarantine, or other restraint pursuant to the health laws of any State, at such convenient places therein as the safety of the public revenue and the observance of such health laws may require.”

It will be observed that merchandise under these circumstances is under United States laws, and that such merchandise may be carried anywhere in the Union from such warehouse; and it is the opinion of the writer that it is



not even an extension of the power of the General Government to control the whole matter under such circumstances.

Granting as an unquestioned fact that the State laws and regulations are those of police and wholly internal, the difficulty has been and still will be to keep such transportable disease-poisons within the limits of the State lines and under State regulations. The Hon. Erastus Brooks, at the last session of this Association, stated that which must be received as a sanitary axiom: "Epidemics are public enemies." The disease-poisons producing epidemics are spread by commercial intercourse, traffic, and other means. Being a public enemy, the whole matter, so it occurs to me, should be relegated to the national authorities, so as to provide for that other enumerated duty of the General Government, "to provide for the common defence."

But an epidemic cannot be handled like a bale of goods, or other packages of merchandise. As common enemies they have often broken the centre, and outflanked strict military sanitary cordons, and won deadly victories, because we do not as yet have the arms of precision wherewith to combat them. Nevertheless I believe that some day, with improved armaments, sanitarians will be able to conquer a lasting peace.

There is no question, that, if, say, yellow fever could be confined to one State, the unanimous and cordial assent of every other State in the Union would be given to that State to keep it there and enforce its internal police laws to the utmost. The moment, however, that the epidemic arrives by commercial avenues at the borders of another State, and commerce between the States commences at that moment, the supreme law of the land should and does stand ready to interpose whatever of efficiency can be wielded to protect the public health. In the third section of the Act of June 2, 1879, occurs these words: "To prevent the introduction of contagious or infectious diseases into the United States from *foreign countries, and into one State from another.*" To put in force such measures as the various States may have ordered by appropriate legislation to the end of preventing the introduction of said diseases, there must be, —

*First*, A knowledge that such diseases are in existence in another State. *Second*, That this knowledge should be communicated between like responsible authorities. The methods of communicating such information to such authorities in the different States is a matter of minor detail.

To obtain the first, it is deemed essential that local health boards should be constituted in the various municipalities. The knowledge received by such boards should be collected, received, formulated, and published by a State board as the central bureau for the common information of all, as well as a means of facilitating the administration of the health laws of the State. In the United States, by a parity of reasoning, the National Board of Health should remain permanently established, in order that the information collected by the State boards may be utilized for the common weal, and because, in entering upon the broader field of international sanitary jurisprudence, a recognized central health bureau under the General Government is a primary

essential, without which we are cut off from the means of obtaining from other governments official and trustworthy information as to all matters concerning the public health of their territories. It is thus seen that there is proposed a wider sphere of action for the National Board of Health, and also a desire to bring the Board into closer relations with State and analogous foreign boards, in order that the interest and object we all, I trust, sincerely have at heart, — public health, — may be advanced.

My adherence is given to a central superintending board with more powers than are now delegated to the National Board of Health. How far supervision and administration for both should, in the opinion of the writer, be united in one body, is a question which demands long and thoughtful consideration. He is also of the opinion that the States should co-operate with the National Board of Health, by means of such instruments as State boards of health or like State organizations, in all the duties and responsibilities which appertain to such boards, and that the National Board of Health should co-operate with the duties of State boards, and be able, by statutory provision, to secure promptly trustworthy and accurate detailed information upon all matters concerning the public health in a State. A great many of these matters, it has been suggested, have been proposed by Bentham for the consideration of his health minister.<sup>1</sup>

That scheme, as many of you are aware, especially those who have been interested in sanitary jurisprudence, grouped preventive and curative medicine in all their details, and proposed codes for their administration : it also proposed to extend these duties to the care of all subjects which are now grouped under the comprehensive term of social statics. The very extent of the duties would have demanded Argus eyes with Briarean hands for their accomplishment.

But, to secure all this, appropriate legislation is necessary ; and such legislation needs the careful and profound consideration of jurists. As sanitarians we exhibit the object to be secured : the legal profession must in turn show us the ways and means.

I may remark here that it seems more than useless to depend on voluntary information from either States or nations as to the conditions of the public health in their respective territories. What are now but voluntary contributions to such information in the United States should be made mandatory in character. My experience and observation suggest no other means. I also beg to state, that not for a single moment is undervalued the cordial and zealous manner in which the contributions of hundreds of observers have been made ; but I am compelled to remark, that to secure even matter enough to have a fractional idea of disease and death movement in the United States has been a labor of combating, frequently, assumptions presented as facts, and of pretences rather than knowledge. The means of securing prompt and trustworthy information of the existence of contagious or infectious diseases, and its rapid publication between nations, however, is a subject of treaty. No State or municipality can officially deal with a foreign state in such matters ;

<sup>1</sup> See Richardson's (B. W.) *Ministry of Health*, *passim*.

for foreign states recognize in all their relations only the sovereignty of the United States. Art. I., sect. 10, of the Constitution states, "No State shall enter into any treaty, alliance, or confederation." Art. II., sect. 2, delegates the treaty-making power to the executive, "by and with the advice and consent of the Senate." States therefore are powerless under the Constitution to furnish the necessary official information to foreign governments; and, even in the matter of interstate comity upon these subjects, a central, national, organized body, as has been stated, to which all alike could apply for authentic information, is an essential in the interests of public health. An instance may bring this point out clearly. During the present year the government of Spain declared quarantine against the port of Philadelphia on account of cholera. The government of Sweden and Norway instructed its pilots to have a watchful care over vessels coming from Philadelphia with sick on board, on account of cholera. This information was communicated to the National Board of Health by the Department of State, and the health authorities of Philadelphia were promptly notified. In the official reply to this notification the health authorities of Philadelphia, under the seal of their office, declared that not a *case* of cholera had occurred in that city for a year. This information was communicated to the State Department for its use and guidance.

A useless quarantine had been established against the commerce of the second largest city in the Union, that had not the shadow of fact for its base, only rumor alone. I am perfectly safe in stating, that at the time of the promulgation of the quarantine against Philadelphia on account of cholera, for six months previous, and until the present writing, not a case of cholera had been reported as existing anywhere in the United States.

Had the question of the existence of cholera been addressed by the respective governments interested to the National Board of Health, and had the Board the legal right to obtain the necessary official information, a useless and perhaps burdensome restriction upon the commerce of that city might have been entirely prevented. As it was, the information given was an act of courtesy, not a matter of right; and the subject is presented to the consideration and judgment of any interested as to what mischief might have occurred, had such rumor gone to the full extent of affecting the whole commercial interests of the United States. The like action may take place in the future towards any port in the United States; and the outcry will be more or less loud, according to the size of the port, and the extent to which its commercial interests are interfered with or affected. I offer all I have stated as part of my plea for the permanency of the National Board of Health, not proposing any plan for or change in its organization, but to call attention to what will become a more or less prominent function of the Board in its relations with the States and with foreign health authorities. I have also to offer my convictions regarding the functions of the National Board of Health. In its full action it would simplify the modes of administration of health and quarantine laws; it would secure their efficiency by prompt action; it would remove some of the cause of commercial jealousy between ports; it would secure a better sanitary condi-



tion of ships, cargoes, passengers, and crews than now obtains ; it would afford to the numerous local health boards accurate and trustworthy information, in so far as that is attainable by official routine, as to the sanitary conditions of places, etc. ; in cases of dissension between health boards, it would be made the umpire, as it would be removed from local or partisan bias ; it would secure a uniformity in the collection of vital statistics, and so determine, in so far as it is possible, those laws governing the living man in his social relations, the which laws are now unknown and conjectural. It would encourage and foster those important elements in general sanitation, sanitary surveys, both geological and topographical, of localities ; the water-supplies of cities and towns, as well as their drainage ; the hygiene of industrial pursuits ; the preparation and care of food-supplies ; the construction, ventilation, lighting, and warming of public buildings ; the removal of excreta, garbage, etc. ; the utilization or other disposal of sewage, etc. It would relieve in many instances the burdensome and annoying restrictions imposed by local quarantines upon commerce by giving facts, rather than suspicions, upon which a health officer should base a sound, practical judgment. It would teach to those who would learn, that quarantine does not mean detention for forty days, but does mean the vigorous application and action of sanitary laws. It would aid the practising physician by giving him due and timely notice of the locality, existence, rise, prevalence, and decline of pestilential diseases, and discover, perhaps, the laws of the modes of their transmission. It would stimulate places likely to be attacked by such diseases to inaugurate such measures of prevention consonant with the scientific knowledge of the time as would render such places less liable to become affected, if not preventing entirely such attack, and so, in a greater or less degree, avert danger, disarm panic, reduce the chances of sickness and death, and in the like many instances fulfil its great object, — guarding the public health.

It is believed that the National Board of Health is but an evidence of the slow but inexorable operation of the law of evolution as it applies to sanitary science ; and, whilst fully agreeing with Spencer as to the possibilities of a coming sanitary millennium far in the future, it is not considered wise or prudent to neglect the proper means to that end by either supineness of thought or act. The facts are all patent enough, the conditions and relations of the facts, perhaps, also ; and it is the sublimity of foolishness to fold one's hands without an endeavor to put out the fire that is consuming the house rapidly, because one possesses the knowledge that a much slower process of oxidation will destroy the building *in time*. The writer has endeavored to present this view of the subject simply as one who is interested in sanitary science, and not from any politico-economical views he may entertain, provided he has any, and desires to reiterate his honest conviction that centralization of the means to accomplish all that is desirable, and considering also in such centralization the eminent utilitarian results, in matters affecting the public health, can best be accomplished by the National Board of Health as now organized, with, however, enlarged jurisdiction. Such a "consummation is devoutly to be

wished for ;” and he believes, that, in the future advance of sanitary science in this country, such will be the outcome. The opinion of the Hon. D. B. Eaton is of practical value in this connection. Mr. Eaton considers, that, if the nation can make the minute inquiry required by the census, can collect and publish the weather-signs, obtain information concerning the extent and value of the crops, exercise jurisdiction over every package of merchandise, and over every vessel in navigable waters, tax for educational purposes, and seize private property for public benefit, “how can it be denied that it is the right and duty of the General Government to bring the diverse elements of sanitary jurisdiction, as far as practicable, under one efficient Board, which shall act in harmony with the health boards of the several States?”

It is the opinion of the writer that the whole matter of quarantine is within the competent jurisdiction of Congress; and this opinion is based upon judicial decisions.

It has been decided, —

That the power of Congress to *regulate* commerce with foreign nations, or between the several States, is exclusive.<sup>1</sup>

That to regulate implies full power over the thing to be regulated.<sup>2</sup>

That it may regulate ships and vessels so far as they are engaged in the carrying-trade.<sup>3</sup>

That it includes every subject of commerce to which legal discretion may apply; and to regulate the whole subject as much by what it leaves out, without any positive regulation, as by what it expressly provides for.<sup>4</sup>

That it is for Congress to determine when its full power shall be brought into action, and as to the regulations and sanctions which shall be provided.<sup>5</sup>

That the power may be exercised wherever the subject exists; and this may be within the territorial jurisdiction of the several States, and, when exercised, is exclusive of the same power in the several States.<sup>6</sup>

That the power to regulate comprehends the control for that purpose, to the extent necessary, of all the navigable waters of the United States accessible from a State other than those in which they lie; to the control of all navigable waters extending to the seacoast, and does not stop at the State boundary.<sup>7</sup>

That in the concurrent powers of the National and State Governments, whilst the States are not absolutely prohibited from legislation as to regulating commerce, they may do so while the power of Congress lies dormant. Amongst

<sup>1</sup> *Gibbons v. Ogden*, 9 Wheat. 1. *Brown v. Maryland*, 12 Wheat. 412. *Martin v. Waddell*, 16 Peters, 367. *Allen v. Newberry*, 21 How. 246. *Passenger cases*, 7 How. 282.

<sup>2</sup> *State Freight Tax*, 15 Wall. 279.

<sup>3</sup> *The Martha Washington*, 3 Wall. 249.

<sup>4</sup> *Dred Scott v. Sandford*, 19 How. 622. *The Chusan*, 2 Story, 466. *Gibbons v. Ogden*, 9 Wheat. 1. *Holmes v. Jennison*, 14 Peters, 450.

<sup>5</sup> *New York v. Miln*, 11 Peters, 102. *U. S. v. Combs*, 12 Peters, 72.

<sup>6</sup> *Gibbons v. Ogden*, 9 Wheat. 1. *U. S. v. New Bedford Bridge*, 1 Wood and M. 486. *U. S. v. Duluth*, 1 Dill. 172. *Cooley v. Port Wardens*, 12 How. 299.

<sup>7</sup> *Gilman v. Philada.*, 3 Wall. 713. *Gibbons v. Ogden*, 9 Wheat. 1. *The Daniel Ball*, 10 Wall. 564. *The Genessee Chief*, 12 How. 443. *The James Morrison*, Newb. 248.

the concurrent powers of Congress and the States, quarantine is enumerated : and it has been decided, that, where Congress does not act, the States may legislate on local and appropriate matters, though they may be connected with commerce ; but, in case of the action of Congress, the State laws must yield.<sup>1</sup>

Such are the facts upon which the writer bases his opinion that both quarantine, and all regulations flowing from it concerning the public health, so far as the States are concerned, are within the competent jurisdiction of the Congress.

Pertinent to this whole matter, it is desired that observant and thoughtful attention be given to the remarks of my colleague, the President of the National Board of Health, Professor James L. Cabell, as presented to the American Medical Association in a paper read at its meeting in Richmond, May, 1881, entitled, "The National Board of Health and the International Sanitary Conference."

The American Public Health Association, at its meeting in Richmond, adopted the following resolution : —

"That it is the duty of the General Government to invite foreign nations to co-operate with it in the establishment of uniform and effective quarantine regulations."

The result of this resolution was the passage of a joint resolution of Congress, approved May 14, 1880 (Appendix IV.), authorizing the President of the United States to call an International Sanitary Conference to meet at Washington, D.C., to which the several powers having jurisdiction of ports likely to be infected with yellow fever or cholera should be invited to send delegates, properly authorized, for the purpose of securing an international system of notification as to the actual sanitary condition of ports and places under the jurisdiction of such powers, and of vessels sailing therefrom. It will be observed that the resolution of the Association was directed to the establishment of uniform and effective *quarantine* regulations ; and that the joint resolution of Congress, whilst actually specifying ports likely to be infected with yellow fever and cholera, extended the research far beyond the quarantines of such places to the extent of determining the *actual sanitary condition of ports and places, and vessels sailing therefrom*, and also *a system of international notification of these conditions*. This conference met in Washington, D.C., in the Hall of the Department of State, Jan. 5, 1881 ; adjourned *sine die*, March 1, 1881 ; and the various protocols of its proceedings were presented to the Senate, Oct. 12, 1881, and are now in the course of publication.

At this conference twenty-seven governments were represented, for the most part by their already accredited diplomatic officers to the United States. Germany, Austria, Hungary, Belgium, Spain, Great Britain, Mexico, the Netherlands, Portugal, and the United States of Colombia were in part represented

<sup>1</sup> License cases, 5 How. 583. The *George S. Wright*, Deady, 596. *Hobard v. Dorgan*, 10 Peters, 121. The *John Fraser*, 21 How. 184. The *America*, How. 177. *Brown v. Maryland*, 12 How. 419. *Lincoln v. the Volusia*, 4 Pa. L. I. 65. The *Panama*, Deady, 32.



by special delegates, many of them being medical men of high official position in their own countries.

The delegates from the United States presented to the conference an informal paper based upon both the letter and spirit of the joint resolution of Congress. This paper had reference to such international concessions as were considered necessary to enable the consular agents of the several powers to obtain and transmit to their respective governments trustworthy information as to the sanitary condition of ports of departure, and also of the vessels about to clear from such ports for their respective countries, each government reserving to itself the application of its own quarantines. This paper was referred by the conference to a committee composed of all the special delegates present, with several of the diplomatic delegates who had previously given attention to such matters. The committee adopted the preamble and several of the propositions noted in the paper presented by the delegates of the United States, but prefaced the matter by two fundamental articles. These articles were, —

I. That it be recommended to the conference that it be admitted as an international principle of sanitation that it is highly desirable to adopt an international system of notification concerning sanitary matters and the appearance and disappearance of contagious and infectious diseases.

II. That it is the opinion of this committee that it must be highly advantageous to permit certain sanitary inspections to be made by foreign agents in ports of various nations, subject to such rules as are necessary for the safeguard of each country's sovereignty and of each country's commercial interests.

The special propositions following indicated the methods by which these principles could be rendered effective; but the committee were disinclined to accede to the proposition of the United States delegates that the consuls should have the right to make the sanitary inspections, considering the duty as technical in character, belonging especially to medicine, and therefore to be made by medical men attached to the consulates.

Whilst fully admitting the fact that the duty, being technical in character, should be delegated to an officer skilled in sanitary science, the delegates of the United States objected to the methods on the score of its expense, and the institution of a corps of officials, grave ones in a country that coins the phrase "the almighty dollar," and where office-seeking is an avocation as well as a recognized cause of mental unsoundness. Consuls were selected because they are the accredited representatives of the government at the port of departure, that their official status would secure trustworthy information, that due credence pertains to their official acts, and because the issue of the certificates of such inspection, and the other sanitary information, — that is, a bill of health, — is legally one of a ship's papers.<sup>1</sup> The idea that a consul should be limited to his personal views upon the matters presented for his consideration

<sup>1</sup> See Marshall on *Insurance*. Jacobsen's *Sea Laws*. That a bill of health is essentially a necessary paper, see Appendix V.

in the sanitary history of the vessel, cargo, passengers, and crew, or as to the sanitary condition of the port of departure, is not to be entertained for a moment: it is far more likely, that, even to form an opinion worthy the name, he will be compelled to resort to the technical knowledge and experience of a physician.

After the committee had submitted its report to the conference, two difficulties were presented which very much impeded the road to a ready and prompt acceptance to that report. The first was the decided opposition manifested by the diplomatic members of the conference to the fundamental proposition that it is desirable *to permit sanitary inspections to be made by foreign agents in the ports of the various nations of all vessels taking their departure from such port to the port of entry represented by a foreign agent.* This proposition — a concession on the part of the delegates of the United States — is deemed essential to the attainment of the ends submitted by the United States in calling together this conference. The second difficulty was the proposed establishment of cumbrous systems of international sanitary bureaus. It is proposed here to consider the first-mentioned objection, having expressed my views as to the second in the first part of this paper. How well or ill the duty assigned to the delegates of the United States has been performed, it does not become me to speak; but from my own stand-point is submitted some of the results attained in which we are all more or less particularly interested, and because it has been didactically stated, before the International Medical Congress, that the conclusions of the conference are not satisfactory, and will give no practical result. It must be stated here, that, before the closing of this conference, all the decisions upon the questions presented, as well as the final act, were expressly stated to be held "*ad referendum*;" in other words, that the matters so presented must be referred to the home governments. The meeting was simply a conference, not a convention with plenary powers; and the expressions of opinion, therefore, have more or less of personal character, and are not to be taken as the expressed views of the powers represented. A convention with plenary powers, so that a treaty could be made, is, in the opinion of the writer, now a necessity; for he feels assured that a further consideration of the subjects presented by the United States delegates would be followed by concessions of importance to sanitary science, and more particularly to the interests of public health.

The opposition of the diplomatic members of the conference, as has been stated by my colleague in the conference, Professor James L. Cabell, to the principle of permitting sanitary inspections by agents of foreign powers, was persistent and unyielding. In the final act of the conference, this principle is admitted under certain restrictions. It will be observed that the right of visitation and search is in a measure involved in the word "inspection." The terms "visitation," "search," "approach," "examination," appear, in the legal text-books consulted, to be used as synonymous. In the Act of June 2, 1879, the word "inspection" can be understood in no other sense.

Now, according to jurists, the right of search and visitation is a belligerent

right, exercised only on the high seas, by public armed vessels of the belligerents, upon vessels flying neutral flags ; it ceases with the termination of hostilities between the belligerents ; is allowed by the general consent of nations ; is limited by the time of war ; is essential to the right of determining and capturing an enemy's property, contraband of war, and vessels committing a breach of blockade ; is for determining the nationality and regularity of the ship's papers, etc. A ship's papers are defined to be in law, "The documents expected to be found on a neutral ship, and are,<sup>1</sup> the register, the passport, or sea-letter, the muster-roll, the charter-party, the bills of lading, the invoice, the log-book, and the *bill of health*."<sup>2</sup>

How jealously this right is guarded, and to what extent it pertains, may be understood from the following opinions of jurists who have given attention to the matter : and it will be observed, that, from these opinions, the fact that a qualified right of search, or inspection, may be deduced ; and, upon such deduction, a sanitary right of search, as I have termed it, can be based.

Judge Story, in commenting upon the right of search and visitation, says, "Mere visit does not give the necessary information. The moment you ask to examine the papers, or ask a single question, it is a search."

Masse (*Droit Commercial* Liv. 2, Tit. 1, chap. 2, sect. 2) says, "that, whatever may be the object of the visit in time of peace, it is always an act of police, which cannot be exercised by one nation towards another, because it implies, on the part of the visitor, a sovereignty, incompatible with the reciprocal independence of nations. Furthermore, two nations cannot advantageously grant one another, by special conventions, the reciprocal right of visit in peace. The appreciation of the utility of conventions of this nature is undoubtedly a political question. But it is certain, that, as such conventions imply an abandonment of the sovereignty, which is, in its very essence, inalienable, and incapable of being parted with, the two nations which have mutually given up their rights can only have made a temporary abandonment of them, which no lapse of time can render definitive."

Part of Masse's opinion is true. In this instance the visitation certainly is an act of sanitary police ; but the statement, that on the part of the visitor it implies a sovereignty over the visited, or that the visited have surrendered

<sup>1</sup> See Marshall on *Insurance*, Book i., chap. 9, sect. 6, Burrill's *Law Dictionary*, etc.

<sup>2</sup> "Bills of health," "passports of health," "letters of health," etc., are said to have been first used in 1527, during a fatal plague in Italy. In 1596 a Turkish company in Aleppo established a like practice. In 1636 a bill of health was made obligatory in England, but they did not come into general use until 1665. The earliest quarantine was against the Black Death, and was instituted by the Viscount Bernabo of Reggio, Jan. 17, 1374. Goods were confiscated, and the admission to the city of *persons* from infected places was forbidden under pain of death. The first lazaretto was established about 1403. The first council of health, or board of health, the "*Sopra la Sanita*," was founded in Venice in 1485, and was composed of three nobles. In 1585 they were empowered to impose improvement, and to sentence to death any infraction of their rules and regulations ; and from their decisions there was no appeal. The captain of every ship was obliged to show at their lazarettos a bill of health. This bill of health was written and issued by the consuls of the different commercial nations.



sovereignty upon such visit, cannot be defended upon logical grounds, nor also that it is incompatible with the reciprocal independence of nations. Nor does the writer see that nations cannot advantageously grant one another, by special conventions, agreements, or treaty, the reciprocal right of sanitary visitation and search inuring to the common weal of both; nor is it seen, from a sanitary point of view, that such conventions imply an abandonment of any sovereignty whatever. The position that two or more nations cannot grant by treaty the right of visitation in time of peace, is, to use the words of an eminent jurist, "simply absurd."

Lords Aberdeen and Palmerston assert that the right of visitation and search cannot exist in time of *peace*, independent of treaty; and this assertion, says Lawrence, is established as well by institutional writers as by the practice of nations.

I have now to offer my views upon what has been already termed "the right of sanitary visitation and search."

This right is a peaceful right, to be exercised within the territorial jurisdiction of the contracting parties; to be exercised by civil officers at the port of entry to which the vessel is bound, irrespective of the nationality of the vessel; is to exist, if called into existence, at the will of the consenting parties; is an essential to the public-health interests of the agreeing parties; is for the purpose of determining exclusively the sanitary condition of the vessel, cargo, passengers, and crew, that they are not severally and collectively contraband of public health; is in the interests of peace, humanity, civilization, and commerce; and is to be regulated by treaty.

The terms "contraband of public health" have been used. The word has its derivation from "contra," "bannum,"—under the ban, against public proclamation, prohibited. It is suggested for consideration the propriety of declaring by legal proclamation certain articles as are known to be more or less the carriers of disease-poisons shipped from infected ports as contraband of public health, under certain circumstances affecting the health of the port. To what extent this should be carried, both as to time and place, the writer is not now prepared to say. The government of Portugal has taken a step in that direction by prohibiting the introduction of certain articles from infected ports. In New Orleans in 1881 a committee of the medical and sanitary associations divided commercial articles for such purposes into three classes. The report of the committee on quarantine regulations made to the Fourth National Sanitary Convention, 1860, also divided all merchandise for quarantine purposes into three classes. The law of Denmark in regard to the introduction of infectious diseases makes provision for a *proclamation* forbidding the importation of certain articles arriving at the ports of the kingdom from infected or suspected places.

Austria-Hungary, Turkey, Russia, England, Germany, Italy, and the regency of Tunis classify merchandise for quarantine purposes; and in Spain certain articles of merchandise are "suspected" in vessels arriving with "foul" bills of health. The further consideration of this question becomes a matter of detail.

The writer is of course cognizant of all the differences between the right of search and its exercise as defined by writers upon international law and the proposed sanitary right of search. The differences, he submits, are well defined; but there is no controverting the fact that it is a search, and he admits it in its entirety. What restrictions should be made to secure its practical efficiency, and prevent any abuse of the proposed right, is a question which he is not competent to discuss, as it passes from the domain of international jurisprudence to the complexities of local legislation. It certainly appears to him that it is within the scope of the enlightened jurists of the day to determine the mode of overcoming the difficulties, and to reduce to harmonious action the various rulings. That which may in the outset be considered in such matters as a courtesy between nations, becomes, in the lapse of time, custom; and custom makes law.

It is not desired, nor is it deemed advisable, that an inquisitorial search should be made: the search and visit are to be made in the interests of the public health of all concerned, by mutual consent, and the sovereignty of the vessel jealously respected under all the circumstances. I know the delicate nature of the ground upon which I tread, and in these matters would inculcate no sentimental affability, but a manly recognition of doing unto others as we would have them do unto us. It is, however, an acknowledged axiom of universal law, that every party, while exercising his own rights, must take care not to violate the rights of others. "*Sic utere tuo, ut non alienum laedas.*"

Furthermore, Woolsey states that "it is admitted by all, that within the waters which may be called the territory of nations, as within a marine league, or in creeks and bays, the vessels of a friendly state may be boarded and searched on suspicion of being engaged in unlawful commerce, or of violating the laws concerning revenue," and also observes "that this kind of right of search is an accident of sovereignty in a state of peace, but is confined, in its exercise, to a small range of the sea."

Of like character, it must be conceded, is the right of visitation and examination made by quarantine and health officers. Now, it is only proposed to subject this same right of sanitary search, as executed by the quarantine officers at the ports of entry, to the consuls of the agreeing powers at the ports of departure, and under such restrictions that no offence occurs to the sovereignty of said port of departure. There are no inherent difficulties in the matter, none certainly which a civilized jurisprudence cannot readily set aside. Mutual respect and forbearance should characterize this sanitary search for peaceful and humane objects; and such forbearance and respect is placed upon the opposite scale to the offensive belligerent right founded upon distrust, and the anger engendered by a state of war. It appears to me, in the language of Mr. Woodbury, "that it is within the province of a sovereign nation to do what is just and honorable as to the world at large, or as to the general interests of humanity."

"If," said Lord Stowell, in his decision in the case of the French vessel,

the "Louis," in 1817, "this right of war is imported into peace by convention, it will be for the prudence of states to regulate in that convention the exercise of the rights with all the softenings of which it is capable."

In considering the whole matter, it seems that the progress of the law of the right of search, from perhaps its earliest enunciation in the "Consolato del Mare," or the antecedent "Rhodian laws," and the "Rôles d'Olerón," to its present legal limitation, as well as the proposed extension of its use as a sanitary measure involving the protection of the health interests of nations, emerges from the slow but steady advances in civilization.

Most of the argument, the writer admits, is in behalf of the sanitary inspection of vessels, cargoes, passengers, and crews; and he trusts to be excused for any earnestness in presenting it, as he believes it to be the primary object of sanitary interest, in order to prevent the introduction from foreign ports of contagious and infectious diseases. The knowledge of the condition of a port from which a vessel sails, is, however, of secondary importance, but is not at all to be undervalued.

Diseases may be introduced, (1) By foul vessels with stagnant and putrid bilge-water, and the drippings and drainings from putrescible cargoes; (2) By cargoes of rags, woollens, and the like animal and vegetable articles (porous in character) from ports where contagious and infectious diseases existed whilst the vessel was being laden; (3) By filthy bedding, baggage, and clothing of emigrants in overcrowded vessels; (4) By the poisoned air in the hold; (5) By diseased passengers being crowded together; (6) By diseased passengers.

Always a vessel, — a ship the carrier of disease. Quarantine establishments costly in construction, costly in maintenance, vexatious and harassing to mercantile interests, have their foundations in foul ships as the carriers of disease-poisons.

I am disposed, both from my own observation and experience, to accept the position of M. Fauvel (1871) that the nature of all quarantines is determined by the sanitary condition of the ship. This places the sanitary condition of the ship as of primary and quarantine of secondary importance in the means of prevention of disease and the protection of public health. Considered as a financial question, these establishments would be reduced to their minimum of expense and mercantile annoyance by attention to the exact conditions detailed upon the bill of health. It seems easy to have the jurist frame a law which will prevent this state of things, and not interfere with commerce. The whole point to be presented to him is, to secure a clean ship, clean cargo, clean passengers, clean crew, and sailing from a clean port. It is so simple, so plain, that it appears to me it could all be accomplished by the simplest code of Naval Hygiene, — save the clean port, which, of course, is in the domain of municipal sanitation. Were proper officers appointed at every port, with power to examine into the condition of all vessels sailing thence in respect to construction, dryness, and ventilation, the health and number of the crew, the condition and accommodation of passengers, the sufficiency of the food and water, and the general cleanliness of the vessel itself, and of the persons, cloth-



ing, and bedding of her entire company, and to allow no vessel to sail that in all these matters falls below the proper hygienic standard; and were the officers of all vessels enjoined under severe penalties to see to their cleanliness, dryness, and ventilation during the entire voyage, as well as to the carrying into effect of these measures necessary to insure the health of all on board, — much would be done to prevent the occurrence of disease, before or after the arrival of a vessel, either among its own company, or, through it, among the people of the port, to which its cargo, crew, and passengers are landed.

Associated with the bill of health should be the “log-book,” another of the ship’s papers.

The log of American vessels, if kept according to the Revised Statutes, sect. 4290 (see Appendix VII.), will give in a measure the condition of the passengers and crew during the voyage so far as recording the occurrence and cause of a death or the outbreak of disease. It is suggested, that at all times the precautions taken to secure cleanliness, ventilation, dryness, and other sanitary measures as tend to the preservation and promotion of health of the passengers and crew, should be noted in the log.

The 17th section of the Passenger Act of 1855 (Appendix VIII.) provides for a report to the Secretary of the Treasury by the collector of the port of as much as could be expected regarding the sanitary condition of the vessel, passengers, and crew during the voyage.

Sect. 9 of the proposed Passenger Act of 1881 (Appendix IX.), presented by the Hon. P. V. Deuster, M.C., of Wisconsin, to Congress, proposes a much more detailed sanitary history of the vessel, passengers, and crew, to be delivered to the officer of customs who first comes on board, and enforces the provisions of the section by penalty.

With these papers the boarding officer at any port would be enabled to determine if a vessel requires the visit of the health officer of the port, if she should proceed to the quarantine station, or continue the course directly for her wharf, dock, or anchorage.

It was asserted at the International Medical Congress in London, Aug. 3, 1881, that the conclusions of the International Sanitary Conference of Washington were not satisfactory, and will give no practical result. In the enumeration of the proper basis for an international agreement, it was stated that it was necessary: —

1. To secure prompt and reliable information of the existence of certain diseases.
2. To communicate to all concerned this information.
3. The agents of the port of destination of a vessel to be permitted to make an inspection.
4. As a means of communication in emergency, these agents to use the telegraph.
5. That, in the event of the issue of a bill of health, it should be in the form proposed by the International Sanitary Conference of Washington.

I have to state that the statement can hardly be based upon a knowledge of facts at all, and I beg leave to present some of the achieved results of the conference.

The conference, in its Final Act, determined, —

“Bills of health shall be in the form hereto annexed.” (Appendix VI.)

This form being that presented by the delegates of the United States, and taken from the National Board of Health form, as modified by the Board at one of its sessions.

Bills of health shall be delivered at the port of departure by the responsible sanitary agent of the central government. *The consul of the country of destination shall have the right to be present at the examination of ships made by the representative of the territorial government, under such rules as may be laid down by international agreement or treaty, and the authority to authenticate the bill of health, and to add thereon such remarks as he may deem necessary.*

An inspection of the bill of health, as recommended by the International Sanitary Conference of Washington, will reveal to any thoughtful sanitarian the fact that all the points enumerated as the proper basis for an international agreement are accomplished facts, so far as the conference is concerned, and that once again in its history, demanded by the progress of scientific sanitation, does the bill of health resume its primary and legitimate rank as a sanitary document.

To make out the bill of health, as required by the conference, information as to the existence of contagious and infectious disease must, *ex necessitate rei*, be secured.

The bill of health is also the means by which said information is communicated.

That, to issue such a bill of health, a sanitary right of search is admitted to the consul of the port of destination; the sanitary agents of the territory being present to furnish the information, and to guard against any infraction of the sovereignty of the vessel or port.

It may be a question to be decided in the future, but the writer is of the opinion that the permission to use the telegraph in emergencies affecting the public health cannot be considered as “privileged communications” are considered. The common weal does not permit of such construction in this matter as a point of privilege.

The writer is disposed to estimate the bill of health, as proposed by the conference, at a much higher value than it appears at first sight to have. The bill may not meet all the requirements of the sanitarian, but it is an enormous advance in sanitary science. Each vessel should be compelled by law to carry one as part of her papers; and, whilst not refusing entrance to our ports of any vessels without such bill properly authenticated, a fine should be imposed upon such as fail to produce this evidence as to the sanitary condition of the vessel and of the port of departure. The right to impose such a penalty is an inherent right of the General Government; and in providing for

the common welfare of the people, both as regards health and commerce, a properly authenticated bill of health, as it involves an inspection of the vessel, its cargo, passengers, and crew, as well as its previous sanitary history, and access to all sources of information as to the sanitary condition of the port of departure, will furnish to quarantine and health officers data upon which they can, other things being equal, base an intelligent opinion upon the necessity for at least admitting a vessel to free *pratique*, or such detention in quarantine as the local law may determine. A proper bill of health is the sanitary patent of the vessel that she is not dangerous to the lives of the community, and is the ship's safeguard in all ports against harsh restrictive quarantines; and I am disposed to think, that, in a reflex manner, it may have its influence in showing the way to improved sanitary work in otherwise foul ports. It may be that a vessel should be cleared without a bill of health. The refusal to take out the bill of health from the consulate should not be a bar to her clearance from the port of departure; but its absence from the ship's papers upon her arrival within any revenue district should subject the vessel to a fine of \$500, as well as the subjection to examination and inspection at the port of entry as a suspected vessel, and liable, therefore, to be placed in quarantine. Such action brings the protection of the public health, so far as vessels are concerned, under national supervision, but does not interfere with any right of the States to enforce their respective quarantine laws where they do not affect the General Government. Perhaps at this time this is all that can be obtained.

It will be observed in this connection also, that there is required "a responsible sanitary agent of the central government." Out of this arises the necessity of a National Board of Health, as the responsible sanitary agent of the central government. It needs no calling the attention of the Association, that in the United States, in many States, and in many more municipalities, there are no responsible sanitary agents of even the State or municipality; and a central bureau should be empowered to collect, formulate, and publish all sanitary information concerning such States and municipalities, as well as to do the like for those States and municipalities where health officers are recognized by law. It is demonstrated that the acceptance of the bill of health, as proposed by the International Sanitary Conference of Washington, carries with it all the requirements necessary for a proper international sanitary agreement.

Viewed simply from a realistic politico-economical stand-point, I believe that such an international agreement would be but a step in the onward progress of that process of assimilation now evident amongst all civilized nations, which has for its ultimate end a general security upon all matters affecting the common weal. The time is opportune for this departure: it secures in a degree the greatest good for the greatest number. Behind it is the sanctity of human life, and "the inalienable rights to life, liberty, and the pursuit of happiness," to secure which "governments were instituted amongst men." Justinian wrote that "the exigencies and necessities of mankind have induced all nations to constitute certain rules of right."



Hobbes states "that the law of nations is the law of nature applied to states and nations."

Vattel remarks, "If a nation is obliged to preserve itself, it is not less obliged to preserve all its members. The nation owes this to itself, since the loss, even of one of its members, weakens it, and is injurious to its own preservation."

Numerous other authorities have enunciated more or less distinctly these propositions, and it is considered that the time has arrived at which it is necessary to interpolate in the law of nations some rule applicable to the public-health interests of mankind. Such a rule appears to flow from the opinions above stated.

The preamble presented by the committee of the International Sanitary Conference of Washington, that

"Nations have an inherent power to prevent, without any breach of their international obligations, the introduction into their territories of contagious or infectious disease," and which was modified by the conference so as to read, that

"Nations have within the limits of international law the right to take the precautions they consider necessary in order to prevent the introduction into their territories of contagious diseases," would have been the inauguration of such a rule in action. This, however, is another accomplished result of the International Sanitary Conference; as it distinctly enunciates that which the writer feels assured will in time become an axiom in the law of nations. It seems that such a law applied to nations is but a logical deduction from the rule that "self-preservation is the first law of nature," as well as an obligation imposed by nature on all.

The rules and regulations for securing the best sanitary condition of vessels (including their cargoes, passengers, and crews) coming to the United States from any foreign port where any contagious or infectious disease exists — prepared by the National Board of Health in accordance with the provisions of the Act of June 2, 1879, entitled "An Act to prevent the introduction of infectious or contagious diseases into the United States" — have their basis in the inherent right and obligation of nations to protect and preserve themselves from pestilence. (Appendix X.)

As to the matter of the introduction of contagious and infectious diseases from adjacent foreign countries, not separated by such geographical boundaries as the seas along other highways of commerce, — such as Canada and Mexico in their relations to the United States, — it is simpler than at first sight appears; but the detail for such prevention needs separate consideration apart from this paper. It is suggested for the consideration of the legislators, that, in all future treaties with foreign powers, provision should be made for the protection of the public health of the contracting parties; and the access of consular and other like accredited officers of the governments to all sources of information relating to it should also be secured by stipulation.

It will be noticed that the writer has presented the subject of national sani-

tary jurisprudence in its relations almost exclusively to quarantine, and that, in considering the matter of international sanitary jurisprudence, existing sources of information represented by the bill of health as proposed by the United States delegates to the International Sanitary Conference of Washington has been used as the basis of these remarks. He asks the lenient consideration of the Association for the imperfections of this reconnoissance into the domain of the jurisprudence of hygiene. No opinion, however, has been stated that is not founded on fact; nor has any deduction been advanced which he does not believe to be logical from the premises and in accordance with the principles of science. In conclusion, he believes, with Ordronaux, "that the basis of human society lies in the recognition of the first law of nature, and that the protection of life, after all, must ever be the culminating point of human legislation."

The following list of books, pamphlets, etc., have been read and consulted more or less in the preparation of this paper:—

Vattel, "Law of Nations;" Ward, "Inquiry into the Foundation and History of the Law of Nations;" Desty's "Shipping and Admiralty;" Wheaton, "History of the Law of Nations," "Elements of International Law;" Marshall on "Insurance;" Woolsey, "International Law;" Lawrence, "Visitation and Search;" Kent's "Commentaries;" Abbot on "Shipping;" Story on the "Constitution;" Jacobsen's "Sea Laws;" Pardessus, "Collection de Lois Maritimes," "Cours de droit Commercial;" "The Black Booke of the Admiralty;" "Revised Statutes of the United States;" Wharton, "Decisions of the Supreme Court;" "Howard License Cases;" Burrill's "Law Dictionary;" Baker, "The Laws relating to Quarantine;" "Report of the Seventh Annual Conference of the Association for the Reform and Codification of the Law of Nations;" "The Southern Law Journal and Reporter;" "The General Sanitary Maritime Regulations of the Kingdom of Portugal;" Proust's "Hygiene International;" Rumsey's "Essays on State Medicine;" Beckmann's "History of Inventions;" the reports of the Quarantine and Sanitary Conventions (1857-60); the works of Jeremy Bentham; McCulloch's Commercial Dictionary; McElrath's Commercial Dictionary; various papers upon State medicine, etc., published in the American Public Health Association reports and transactions of American Medical Association, as well as monographs by Drs. H. I. Bowditch, J. S. Billings, U.S.A., J. L. Cabell, S. E. Chaillé, A. L. Carroll, Edwin Chadwick, B. Dowler, E. Harris, E. McClellan, U.S.A., John Simon, D.C.L., the Hon. T. G. Jones, and others.

I desire also to acknowledge the courtesy of the Hon. Samuel F. Phillips, Solicitor-General of the United States, for placing at my disposition for reference the library of the Department of Justice, as well as to the Hon. A. R. Spofford, librarian of Congress, and Mr. T. F. Dwight, librarian of the Department of State, for similar favors.

## APPENDIX I.

AN ACT TO PREVENT THE INTRODUCTION OF INFECTIOUS OR CONTAGIOUS DISEASES INTO THE UNITED STATES, AND TO ESTABLISH A NATIONAL BOARD OF HEALTH.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That there shall be established a National Board of Health, to consist of seven members, to be appointed by the President, by and with the advice and consent of the Senate, not more than one of whom shall be appointed from any one State, whose compensation, during the time when actually engaged in the performance of their duties under this Act, shall be ten dollars per diem each and reasonable expenses, and of one medical officer of the Army, one medical officer of the Navy, one medical officer of the Marine Hospital Service, and one officer from the Department of Justice, to be detailed by the Secretaries of the several Departments, and the Attorney-General, respectively; and the officers so detailed shall receive no compensation. Said Board shall meet in Washington within thirty days after the passage of this Act, and in Washington or elsewhere from time to time upon notice from the president of the Board, who is to be chosen by the members thereof, or upon its own adjournments, and shall frame all rules and regulations authorized or required by this Act, and shall make or cause to be made such special examinations and investigations at any place or places within the United States, or at foreign ports, as they may deem best, to aid in the execution of this Act and the promotion of its objects.

SECT. 2. The duties of the National Board of Health shall be, to obtain information upon all matters affecting the public health, to advise the several departments of the government, the executives of the several States, and the commissioners of the District of Columbia, on all questions submitted by them, or whenever, in the opinion of the Board, such advice may tend to the preservation and improvement of the public health.

SECT. 3. That the Board of Health, with the assistance of the Academy of Science, which is hereby requested and directed to co-operate with them for that purpose, shall report to Congress at its next session a full statement of its transactions, together with a plan for a national public-health organization, which plan shall be prepared after consultation with the principal sanitary organizations, and the sanitarians of the several States of the United States, special attention being given to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State or local systems of quarantine, and a national quarantine system.

SECT. 4. The sum of fifty thousand dollars, or so much thereof as may be



necessary, is hereby appropriated to pay the salaries and expenses of said Board, and carry out the purposes of this Act. [*Approved March 3, 1879.*]

## APPENDIX II.

### AN ACT TO PREVENT THE INTRODUCTION OF CONTAGIOUS OR INFECTIOUS DISEASES INTO THE UNITED STATES.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,* That it shall be unlawful for any merchant ship or vessel from any foreign port where any contagious or infectious disease exists, to enter any port of the United States except in accordance with the provisions of this Act, and all rules and regulations of State boards of health, and all rules and regulations made in pursuance of this Act; and any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof, shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding one thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States. And in all such proceedings the United States district attorney for such district shall appear on behalf of the United States, and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SECT. 2. All such vessels shall be required to obtain from the consul, vice-consul, or other consular officer of the United States at the port of departure, or from the medical officer, where such officer has been detailed by the President for that purpose, a certificate in duplicate setting forth the sanitary history of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the said vessel, its cargo, passengers, and crew; and said consular or medical officer is required, before granting such certificate, to be satisfied the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases.

That, upon the request of the National Board of Health, the President is authorized to detail a medical officer to serve in the office of the consul at any foreign port, for the purpose of making the inspection, and giving the certificates hereinbefore mentioned: *provided*, that the number of officers so detailed shall not exceed at any one time six; *provided further*, that any vessel, sailing from any such port without such certificate of said medical officer, entering any port of the United States, shall forfeit to the United States the sum of five hundred dollars, which shall be a lien on the same, to be recovered by proceedings in the proper district court of the United States. And in all such proceedings the United States district attorney for such district shall appear on behalf of the United States, and all such proceedings

shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SECT. 3. That the National Board of Health shall co-operate with, and, so far as it lawfully may, aid, State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, and into one State from another; and at such ports and places within the United States as have no quarantine regulations under State authority, where such regulations are, in the opinion of the National Board of Health, necessary to prevent the introduction of contagious or infectious diseases into the United States from foreign countries, or into one State from another, and at such ports and places within the United States where quarantine regulations exist under the authority of the State, which, in the opinion of the National Board of Health, are not sufficient to prevent the introduction of such diseases into the United States, or into one State from another, the National Board of Health shall report the facts to the President of the United States, who shall, if, in his judgment, it is necessary and proper, order said Board of Health to make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries, or into one State from another, which, when so made and approved by the President, shall be promulgated by the National Board of Health, and enforced by the sanitary authorities of the States, where the State authorities will undertake to execute and enforce them; but, if the State authorities shall fail or refuse to enforce said rules and regulations, the President may detail an officer or appoint a proper person for that purpose.

The Board of Health shall make such rules and regulations as are authorized by the laws of the United States and necessary to be observed by vessels at the port of departure and on the voyage, where such vessels sail from any foreign port or place at which contagious or infectious disease exists, to any port or place in the United States, to secure the best sanitary condition of such vessel, her cargo, passengers, and crew; and, when said rules and regulations have been approved by the President, they shall be published, and communicated to and enforced by the consular officers of the United States: *provided*, that none of the penalties herein imposed shall attach to any vessel, or any owner or officer thereof, till the Act and the rules and regulations made in pursuance thereof shall have been officially promulgated for at least ten days in the port from which said vessel sailed.

SECT. 4. It shall be the duty of the National Board of Health to obtain information of the sanitary condition of foreign ports and places from which contagious and infectious diseases are or may be imported into the United States; and to this end the consular officers of the United States, at such ports and places as shall be designated by the National Board of Health, shall make to said Board of Health weekly reports of the sanitary condition of the ports and places at which they are respectively stationed, according to such forms as said Board of Health may prescribe; and the Board of Health shall also

obtain, through all sources accessible, including State and municipal sanitary authorities throughout the United States, weekly reports of the sanitary condition of ports and places within the United States ; and shall prepare, publish, and transmit to the medical officers of the Marine Hospital Service, to collectors of customs, and to State and municipal health officers and authorities, weekly abstracts of the consular sanitary reports, and other pertinent information received by said Board ; and shall also, as far as it may be able, by means of the voluntary co-operation of State and municipal authorities, of public associations and private persons, procure information relating to the climatic and other conditions affecting the public health ; and shall make to the Secretary of the Treasury an annual report of its operations, for transmission to Congress, with such recommendations as it may deem important to the public interests ; and said report, if ordered to be printed by Congress, shall be done under the direction of the Board.

SECT. 5. That the National Board of Health shall from time to time issue to the consular officers of the United States and to the medical officers serving at any foreign port, and otherwise make publicly known, the rules and regulations made by it and approved by the President, to be used and complied with by vessels in foreign ports for securing the best sanitary condition of such vessels, their cargoes, passengers, and crews, before their departure for any port in the United States, and in the course of the voyage ; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases ; and it shall not be lawful for any vessel to enter said port to discharge its cargo or land its passengers except upon a certificate of the health officer at such quarantine station, certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers, and crew ; and the master of every such vessel shall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said certificates required to be obtained at the port of departure, and the certificate herein required to be obtained from the health officer at the port of entry.

SECT. 6. That to pay the necessary expenses of placing vessels in proper sanitary condition, to be incurred under the provisions of this Act, the Secretary of the Treasury be, and he hereby is, authorized and required to make the necessary rules and regulations fixing the amount of fees to be paid by vessels for such service, and the manner of collecting the same.

SECT. 7. That the President is authorized, when requested by the National Board of Health, and when the same can be done without prejudice to the public service, to detail officers from the several departments of the government, for temporary duty, to act under the direction of said Board, to carry out the provisions of this Act ; and such officers shall receive no additional



compensation except for actual and necessary expenses incurred in the performance of such duties.

SECT. 8. That, to meet the expenses to be incurred in carrying out the provisions of this Act, the sum of five hundred thousand dollars, or so much thereof as may be necessary, is hereby appropriated, to be disbursed under the direction of the Secretary of the Treasury on estimates to be made by the National Board of Health, and to be approved by him. Said National Board of Health shall, as often as quarterly, make a full statement of its operations and expenditures under this Act to the Secretary of the Treasury, who shall report the same to Congress.

SECT. 9. That so much of the Act entitled "An Act to prevent the introduction of contagious or infectious diseases into the United States," approved April twenty-ninth, eighteen hundred and seventy-eight, as requires consular officers or other representatives of the United States at foreign ports to report the sanitary condition of and the departure of vessels from such ports to the Supervising Surgeon-General of the Marine Hospital Service, and so much of said Act as requires the Surgeon-General of the Marine Hospital Service to frame rules and regulations, and to execute said Act, and to give notice to Federal and State officers of the approach of infected vessels, and furnish said officers with weekly abstracts of consular sanitary reports, and all other Acts and parts of Acts inconsistent with the provisions of this Act, be, and the same are hereby, repealed.

SECT. 10. This Act shall not continue in force for a longer period than four years from the date of its approval. [*Approved June 2, 1879.*]

### APPENDIX III.

#### TITLE LVIII.—THE PUBLIC HEALTH.

SECT. 4792. The quarantines and other restraints established by the health laws of any State respecting any vessels arriving in or bound to any port or district thereof, shall be duly observed by the officers of the customs revenue of the United States, by the masters and crews of the several revenue cutters, and by the military officers commanding in any fort or station upon the seacoast; and all such officers of the United States shall faithfully aid in the execution of such quarantines and health laws, according to their respective powers and within their respective precincts, and as they shall be directed from time to time by the Secretary of the Treasury. But nothing in this title shall enable any State to collect a duty of tonnage or impost without the consent of Congress.

SECT. 4793. Whenever, by the health laws of any State, or by the regulations made pursuant thereto, any vessel arriving within a collection-district of such State is prohibited from coming to the port of entry or delivery by law established for such district, and such health laws require or permit the cargo of the vessel to be unladen at some other place within or near to such district,

the collector, after due report to him of the whole of such cargo, may grant his warrant or permit for the unlading and discharge thereof, under the care of the surveyor, or of one or more inspectors, at some other place where such health laws permit, and upon the conditions and restrictions which shall be directed by the Secretary of the Treasury, or which such collector may, for the time, deem expedient for the security of the public revenue.

SECT. 4794. There shall be purchased or erected, under the orders of the President, suitable warehouses, with wharves and enclosures, where merchandise may be unladen and deposited from any vessel which shall be subject to a quarantine or other restraint, pursuant to the health laws of any State, at such convenient places therein as the safety of the public revenue and the observance of such health laws may require.

SECT. 4795. Whenever the cargo of a vessel is unladen at some other place than the port of entry or delivery under the foregoing provisions, all the articles of such cargo shall be deposited, at the risk of the parties concerned therein, in such public or other warehouses or enclosures as the collector shall designate, there to remain under the joint custody of such collector and of the owner or master or other person having charge of such vessel, until the same are entirely unladen or discharged, and until the articles so deposited may be safely removed without contravening such health laws. And, when such removal is allowed, the collector having charge of such articles may grant permits to the respective owners or consignees, their factors or agents, to receive all merchandise which has been entered, and the duties accruing upon which have been paid, upon the payment by them of a reasonable rate of storage, which shall be fixed by the Secretary of the Treasury for all public warehouses and enclosures.

SECT. 4796. The Secretary of the Treasury is authorized, whenever a conformity to such quarantines and health laws requires it, and in respect to vessels subject thereto, to prolong the terms limited for the entry of the same, and the report or entry of their cargoes, and to vary or dispense with any other regulations applicable to such reports or entries. No part of the cargo of any vessel shall, however, in any case, be taken out or unladen therefrom, otherwise than is allowed by law, or according to the regulations hereinafter established.

SECT. 4797. Whenever, by the prevalence of any contagious or epidemic disease in or near the place by law established as the port of entry for any collection-district, it becomes dangerous or inconvenient for the officers of the revenue employed therein to continue the discharge of their respective offices at such port, the Secretary of the Treasury, or, in his absence, the First Comptroller, may direct the removal of the officers of the revenue from such port to any other more convenient place, within, or as near as may be to, such collection-district. And at such place such officers may exercise the same powers, and shall be liable to the same duties, according to existing circumstances, as in the port or district established by law. Public notice of any such removal shall be given as soon as may be. (See sect. 1776.)

SECT. 4798. In case of the prevalence of a contagious or epidemic disease at the seat of government, the President may permit and direct the removal of any or all the public offices to such other place or places as he shall deem most safe and convenient for conducting the public business. (See sect. 1776.)

SECT. 4799. Whenever in the opinion of the chief justice, or, in case of his death or inability, of the senior associate justice of the Supreme Court, a contagious or epidemic sickness shall render it hazardous to hold the next stated session of the court at the seat of government, the chief or such associate justice may issue his order to the marshal of the Supreme Court, directing him to adjourn the next session of the court to such other place as such justice deems convenient. The marshal shall thereupon adjourn the court, by making publication thereof in one or more public papers printed at the seat of government, from the time he shall receive such order until the time by law prescribed for commencing the session. The several circuit and district judges shall, respectively, under the same circumstances, have the same power, by the same means, to direct adjournments of the several circuit and district courts to some convenient place within their districts respectively. (See sect. 1776.)

SECT. 4800. The judge of any district court, within whose district any contagious or epidemic disease shall at any time prevail, so as, in his opinion, to endanger the lives of persons confined in the prison of such district, in pursuance of any law of the United States, may direct the marshal to cause the persons so confined to be removed to the next adjacent prison where such disease does not prevail, there to be confined until they may safely be removed back to the place of their first confinement. Such removals shall be at the expense of the United States.

SECT. 1776. Whenever any public office is removed by reason of sickness which may prevail in the town or city where it is located, a particular account of the cost of such removal shall be laid before Congress. (See sects. 4797-4799.)

#### APPENDIX IV.

*Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the President of the United States is hereby authorized to call an international sanitary conference to meet at Washington, District of Columbia, to which the several powers having jurisdiction of ports likely to be infected with yellow fever or cholera shall be invited to send delegates, properly authorized, for the purpose of securing an international system of notification as to the actual sanitary condition of ports and places under the jurisdiction of such powers, and of vessels sailing therefrom. [Approved May 14, 1880.]*



## APPENDIX V.

LEVY *v.* COSTERTON, 1 STARKIE, 212.

"Under a covenant in a charter party that the ship shall be provided with 'every thing needful and necessary for the voyage,' the owner is bound to provide the proper documents as well as necessities for the ship itself, and is therefore bound to provide a bill of health, if it be essential to the performance of the voyage, within a reasonable time within the intention of the parties." The counsel for the defendant contended, Firstly, that no documents were included in the terms of the covenant; and secondly, that, supposing that the terms of the covenant included documents, they did not extend to a bill of health, which was not a document required by the general law of States.

Gibbs, Chief Justice, was of opinion that the words in fair construction were not to be confined to such things as should be necessary for the ship itself, but that they comprehended every thing necessary for the voyage; and, upon the second point, his lordship was of opinion that a bill of health was to be considered as a necessary document, since it was essential to the performance of the voyage, according to the intention of the parties, within a reasonable time.

The verdict was for the plaintiff.

## APPENDIX VI.

## INTERNATIONAL BILL OF HEALTH.

I, \_\_\_\_\_ (the person charged to deliver the bill), at the port of \_\_\_\_\_, do hereby state that the vessel hereinafter named clears from this port under the following circumstances:—

Name of vessel :	Nature (vessel-of-war, ship, schooner, etc.) :
Tonnage :	Guns :
Apartments for passengers, No. :	Where last from :
Destination :	Name of captain :
Name of medical officer (if any) :	Total number of crew :
Total number of passengers : 1st cabin, ; 2d cabin, ; steerage, :	Cargo :

*Vessel.*

1. Sanitary history of the vessel :
2. Sanitary condition of vessel (before and after reception of cargo, with note of any decayed wood). Note disinfection of vessel :
3. Sanitary condition of cargo :
4. Sanitary condition of crew :
5. Sanitary condition of passengers :
6. Sanitary condition of clothing, food, water, air-space, and ventilation :

*Port.*

## 1. Sanitary condition of port and adjacent country :—

*a.* Prevailing disease (if any) :*b.* Number of cases of and deaths from yellow fever, Asiatic cholera, plague, small-pox, or typhus fever during the week preceding :

Number of cases of—

Yellow fever :

Asiatic cholera :

Plague :

Small-pox :

Typhus fever :

Number of deaths from—

Yellow fever :

Asiatic cholera :

Plague :

Small-pox :

Typhus fever :

*c.* Population according to the last census :*d.* Total deaths from all causes during the preceding month :

## 2. Any circumstances affecting the public health existing in the port of departure to be here stated :

I CERTIFY that the foregoing statements are made by \_\_\_\_\_ ,  
 who has personally inspected said vessel ; that I am satisfied that the said  
 statements are correct ; and I do further certify that the said vessel leaves this  
 port, bound for \_\_\_\_\_ , in \_\_\_\_\_ .

IN WITNESS WHEREOF I have hereunto set my hand and the seal of office,  
 at the port of \_\_\_\_\_ , this \_\_\_\_\_ day of \_\_\_\_\_ ,  
 188 \_\_\_\_\_ , o'clock.

[SEAL.]

[Signature.]

## APPENDIX VII.

## LOG-BOOK.

SECT. 4290. . . . *Fifth*, Every case of illness or injury happening to any member of the crew, with the nature thereof, and the medical treatment.

*Sixth*, Every case of death happening on board, with the cause thereof.

*Seventh*, Every birth happening on board, with the sex of the infant and the names of the parents.

*Eighth*, Every marriage taking place on board, with the names and ages of the parties.

SECT. 4291. Every entry hereby required to be made in the official log-book shall be signed by the master and by the mate, or some other one of the crew : and every entry in the official log-book shall be made as soon as possible after the occurrence to which it relates ; and, if not made on the same day as the occurrence to which it relates, shall be made and dated so as to show the date of the occurrence, and of the entry respecting it : and in no case shall any entry therein, in respect of any occurrence happening previously to

the arrival of the vessel at her final port, be made more than twenty-four hours after her arrival. (See sect. 4597.)

SECT. 4292. If, in any case, the official log-book is not kept in the manner hereby required, or if any entry hereby directed to be made in any such log-book is not made at the time and in the manner hereby directed, the master shall, for each such offence, be liable to a penalty of not more than twenty-five dollars; and every person who makes, or procures to be made, or assists in making, any entry in any official log-book in respect of any occurrence happening previously to the arrival of the vessel at her final port of discharge, more than twenty-four hours after such arrival, shall, for each offence, be liable to a penalty of not more than one hundred and fifty dollars.

#### APPENDIX VIII.

##### "PASSENGER ACT, 1855."

"SECT. 17. *And be it further enacted*, That the collector of the customs shall examine each emigrant ship or vessel on its arrival at his port, and ascertain and report to the Secretary of the Treasury the time of sailing, the length of the voyage, the ventilation, the number of passengers, their space on board, their food, the native country of the emigrants, the number of deaths, the age and sex of those who died on the voyage, together with his opinion of the cause of the mortality, if any, on board, and, if none, what precautionary measures, arrangements, or habits are supposed to have had any, and what, agency in causing the exemption."

#### APPENDIX IX.

##### PROPOSED PASSENGER ACT, 1881.

"SECT. 9. *And be it further enacted*, That it shall not be lawful for the master of any such steamship or other vessel, not in distress, after the arrival of the vessel within any collection-district of the United States, to allow any person or persons, except a pilot, officer of the customs, or health officer, to come on board of the vessel, or to leave the vessel, until the vessel has been taken in charge by an officer of the customs, nor, after charge so taken, without leave of such officer, until all the passengers with their baggage have been duly landed from the vessel; and on the arrival of such steamship or other vessel within any collection-district of the United States, the master thereof shall deliver to the officer of customs who first comes on board the vessel, and makes demand therefor, a correct list, signed by the master, of all the passengers taken on board the vessel at any foreign port or place, specifying separately the names of the cabin-passengers, their age, sex, calling, and the country of which they are citizens, and the number of pieces of baggage belonging to each passenger; and also the name, age, sex, calling, and



native country of each emigrant passenger, or passengers other than cabin-passengers, and their intended destination or location, and the number of pieces of baggage belonging to each passenger, and also the location of the compartment or space occupied by each of such passengers during the voyage; and, if any of such passengers died on the voyage, the said list shall specify the name, age, and cause of death of each deceased passenger; and a duplicate of the aforesaid list of passengers, verified by the oath of the master, shall, with the manifest of the cargo, be delivered by the master to the collector of customs on the entry of the vessel. For a violation of either of the provisions of this section, or for permitting or neglecting to prevent a violation thereof, the master of the vessel shall be liable to a fine not exceeding one thousand dollars."

## APPENDIX X.

RULES AND REGULATIONS FOR SECURING THE BEST SANITARY CONDITION OF VESSELS, INCLUDING THEIR CARGOES, PASSENGERS, AND CREWS, COMING TO THE UNITED STATES FROM ANY FOREIGN PORT WHERE ANY CONTAGIOUS OR INFECTIOUS DISEASE EXISTS.

[*Prepared by the National Board of Health in accordance with the provisions of an Act approved June 2, 1879, entitled "An Act to prevent the introduction of infectious or contagious diseases into the United States."*]

### EXPLANATIONS.

1. The object of the following rules and regulations is to prevent the introduction into the United States of "contagious or infectious diseases."

2. The following diseases are recognized as "contagious or infectious diseases," for the purposes of these rules and regulations: viz., Asiatic cholera, yellow fever, plague, small-pox, typhus fever, and relapsing fever.

3. An "infected" port or place, in the sense of these rules, is a port or place at which either Asiatic cholera, yellow fever, plague, small-pox, relapsing fever, or typhus fever exists.

4. To secure the "best sanitary condition" of a vessel, the following points shall be observed by the owners, agents, or master of such vessel:—

*A.* Exclusion from the vessel, as far as possible, of persons or things known or suspected to be infected.

*B.* Cleanliness, dryness, and ventilation of the vessel, both preliminary to loading and during the voyage.

*C.* Disinfection,—that is, the destruction or removal of the causes of disease,—which includes measures of cleanliness, ventilation, fumigation, etc.

*D.* The crew shall not be allowed liberty on shore after nightfall in suspected localities. They shall not be allowed to sleep on deck, except under awnings. The forecabin shall be well ventilated, and kept dry. Both in port and at sea the bilge shall be pumped out each morning and evening, or more frequently if necessary. The utmost cleanliness shall be observed at sea as well as in port. Each seaman shall have two suits of underclothing. The

clothing and bedding shall be aired every clear day. In tropical climates the men shall be required to wash their persons and change their underclothing every evening after work while in port ; and each working-suit shall be washed, dried, and aired after a day's use. These regulations as to clothing, airing of bedding, and ventilation, shall, as far as possible, be observed at sea as well as in port.

#### RULES AND REGULATIONS.

1. All merchant ships and vessels sailing from a foreign port where contagious or infectious disease exists, for any port of the United States, must obtain from the consul, vice-consul, or other consular officer of the United States, at the port of departure, or from the medical officer,—where such officer has been detailed by the President for that purpose,—a bill of health in duplicate, which shall set forth the sanitary history of said vessel, and that it has in all respects complied with these rules and regulations.

2. No vessel shall have more than one bill of health ; but, if she touches at other ports on the passage, that fact, and the condition of those ports as to the existence of contagious or infectious disease, shall be indorsed upon the original bill of health by the consul, vice-consul, consular officer, or medical officer of the United States.

3. The bill of health shall be in the form appended :—

#### FORM A.

No. . . . . PORT OF . . . . .

THE UNITED STATES OF AMERICA—NATIONAL BOARD OF HEALTH.

#### *Bill of Health.*

I, . . . . . (the person charged to deliver the bill), at the port of . . . . ., do hereby state that the vessel hereinafter named clears from this port under the following circumstances :—

Name of vessel :	Nature (vessel-of-war, ship, schooner,
Tonnage :	etc.) :
Apartments for passengers, No. :	Guns :
Destination :	Where last from :
Name of medical officer (if any) :	Name of captain :
Total number of passengers : 1st cab-	Total number of crew :
in, ; 2d cabin, ; steerage, ;	Cargo :

#### *Vessel.*

1. Sanitary history of the vessel :
2. Sanitary condition of vessel (before and after reception of cargo, with note of any decayed wood). Note disinfection of vessel :
3. Sanitary condition of cargo :
4. Sanitary condition of crew :
5. Sanitary condition of passengers :
6. Sanitary condition of clothing, food, water, air-space, and ventilation :

*Port.*

## 1. Sanitary condition of port and adjacent country : —

*a.* Prevailing disease (if any) :*b.* Number of cases of and deaths from yellow fever, Asiatic cholera, plague, small-pox, or typhus fever during the week preceding :

Number of cases of —

Yellow fever :

Asiatic cholera :

Plague :

Small-pox :

Typhus fever :

Number of deaths from —

Yellow fever :

Asiatic cholera :

Plague :

Small-pox :

Typhus fever :

*c.* Population according to the last census :*d.* Total deaths from all causes during the preceding month :

## 2. Any circumstances affecting the public health existing in the port of departure to be here stated :

I CERTIFY that I have personally inspected the said vessel, and that the above statements are correct.

[Signature of medical officer.]

I CERTIFY that the foregoing statements are made by \_\_\_\_\_, who has personally inspected said vessel ; that I am satisfied that the said statements are correct ; and I do further certify that the said vessel leaves this port, bound for \_\_\_\_\_, in \_\_\_\_\_.

IN WITNESS WHEREOF I have hereunto set my hand and the seal of office, at the port of \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 188 \_\_\_\_\_, o'clock.

[SEAL.]

[Signature.]

4. Each consul, vice-consul, consular officer, or medical officer of the United States in a foreign port shall keep himself thoroughly acquainted with the sanitary condition of the port and its vicinity, especially with regard to the existence of contagious or infectious diseases or epidemics, and shall, upon the request of the owner, agent, or master, make, or cause to be made, an inspection of every ship or vessel bound for any port in the United States, and give the bill of health required by these regulations. Vessels carrying a foreign flag shall be inspected, when practicable, in company with the consul or consular agent of the nation to which the vessel belongs.

5. The fee for such inspection shall be such as may be fixed by the Secretary of the Treasury.

6. The certifying authority at the port of departure shall certify whether vessels carrying passengers are provided with the means of carrying out the provisions of sects. 4267 and 4293 of the Revised Statutes.

SECT. 4257. Every such vessel so employed in transporting passengers



between the United States and Europe, and having space according to law for more than one hundred such passengers, shall have at least two ventilators to purify each apartment occupied by such passengers, one of which shall be inserted in the after part and the other in the forward part of the apartment ; and one of them shall have an exhausting-cap to carry off the foul air, and the other a receiving-cap to carry down the fresh air. Such ventilators shall have a capacity proportioned to the size of the apartments to be purified ; namely, if the apartment will lawfully authorize the reception of two hundred such passengers, the capacity of each such ventilator shall be equal to a tube of twelve inches diameter in the clear, and in proportion for larger or smaller apartments. All such ventilators shall rise at least four feet six inches above the upper deck of any such vessel, and be of the most approved form and construction. If it appears from the report to be made and approved, as provided in sect. 4272, that such vessel is equally well ventilated by any other means, such other means of ventilation shall be deemed to be a compliance with the provisions of this section.

SECT. 4263. The master of any vessel employed in transporting passengers between the United States and Europe is authorized to maintain good discipline and such habits of cleanliness among passengers as will tend to the preservation and promotion of health ; and, to that end, he shall cause such regulations as he may adopt for this purpose to be posted up, before sailing, on board such vessel, in a place accessible to such passengers, and shall keep the same so posted up during the voyage. Such master shall cause the apartments occupied by such passengers to be kept at all times in a clean, healthy state ; and the owners of every such vessel so employed are required to construct the decks, and all parts of the apartments, so that they can be thoroughly cleansed ; and also to provide a safe, convenient privy or water-closet for the exclusive use of every one hundred such passengers. The master shall also, when the weather is such that the passengers cannot be mustered on deck with their bedding, and at such other times as he may deem necessary, cause the deck occupied by such passengers to be cleansed with chloride of lime, or some other equally efficient disinfecting agent. And for each neglect or violation of any of the provisions of this section, the master and owner of any such vessel shall be severally liable to the United States in a penalty of fifty dollars, to be recovered in any circuit or district court within the jurisdiction of which such vessel may arrive or from which she is about to depart, or at any place where the owner or master may be found.

7. For the purpose of isolating the sick, especially those suffering from contagious or infectious diseases, every steamship or other passenger vessel shall have two compartments or spaces to be used as hospitals, one for men and the other for women. These hospitals shall, when practicable, be constructed on the main deck, or on the deck next below the uppermost deck of the vessel.

8. Every vessel, before taking on cargo or passengers, shall be clean and dry ; and the certifying officer may, at his discretion, require that it shall be

thoroughly disinfected, if last from an *infected* port, or if the port of departure be itself *infected*. The examination of the vessel as to cleanliness shall be made before the cargo is taken on, and shall extend to all accessible parts, especial care being taken to note upon the bill of health the presence of decayed wood.

9. Earth and porous stone shall not be used for ballast if avoidable.

10. Merchandise or articles known to be infected shall not be received or taken on board.

11. In case the port is *infected*, the certifying authority may require that the officers, crew, and passengers shall be examined by a medical officer or physician selected for that purpose, and the result reported to him not more than twenty-four hours before certifying to the bill of health.

If small-pox exists at the port, the certifying authority shall require that the medical examination above provided shall extend to all passengers, as well as to the officers and crew, for the purpose of determining their protection against small-pox; and every person found unvaccinated, or not satisfactorily protected, shall be properly vaccinated before the vessel leaves the port; and a record of such vaccinations, including the name of each individual vaccinated, and the date of vaccination, shall be given to the master of the vessel, to be by him delivered to the quarantine authority at the port of arrival.

12. Bills of health can be considered valid only when delivered within twenty-four hours last preceding departure. If the departure is delayed beyond this period, the bill must be *viséd* by the authority delivering it, stating whatever changes have taken place in the sanitary condition of the port, vessel, officers, crew, or passengers.

13. When the port of departure, or its vicinity, is *infected*, that fact shall be noted in the bill of health; and, when the sanitary or other local authority of the port declares the existence of such infection, the bill of health shall give the date of the declaration.

14. A port shall not be considered infected by reason of the existence of contagious or infectious disease confined within the limits of the quarantine station of such port.

15. Physicians attached to sea-going vessels shall be specially charged with the duty of watching their sanitary condition and the health of their officers, crew, and passengers. On arrival of the vessel, they shall report to the health officer of the port the sanitary history of the voyage.

16. In case of the occurrence at sea of Asiatic cholera, yellow fever, plague, small-pox, relapsing fever, or typhus fever, the wearing apparel and bedding used by those affected with such disease shall be boiled for not less than two hours, or burned or sunk.

17. Captains, owners, or agents of vessels shall, at the port of departure, be required to answer, under oath, to the consuls or sanitary officers, all questions as to the sanitary condition of the vessel, etc.

18. Whenever any vessel shall leave an *infected* foreign port, or, having on board goods or passengers coming from any place or district infected with

Asiatic cholera, yellow fever, or plague, shall leave any foreign port bound for any port in the United States, the consul, consular officer, or other representative of the United States at or near such port, may, at his discretion, immediately give information thereof by telegraph to the National Board of Health at Washington, D. C., reporting the name, date of departure, and port of destination of such vessel. The cost of such telegrams will be paid by the National Board of Health.

19. All merchant ships or vessels from any foreign port where any contagious or infectious disease exists, and bound for any port of the United States, must present to the health officer at the quarantine station of such port evidence that these rules and regulations have been complied with, in order that such vessel may enter such port, discharge its cargo, and land its passengers.

#### ADDITIONAL RULES AND REGULATIONS NECESSARY TO PREVENT THE INTRODUCTION OF SMALL-POX INTO THE UNITED STATES FROM FOREIGN COUNTRIES.

1. That all persons coming from or through any foreign port or place in which small-pox exists, who, after the fourteenth day of November, 1881, shall arrive at any port of entry within the United States, shall be subjected to examination as regards their protection from that disease by the proper health authorities of the State within which such port lies, or, in case such authorities shall fail or refuse to enforce this rule, then by some officer or other proper person to be designated by the President of the United States.

2. That in case any person so arriving shall refuse to submit to such examination, or, upon undergoing the same, shall be found not sufficiently protected from small-pox, such person, and, in case he or she be not *sui juris*, then also the person having him or her under charge, shall be detained in quarantine until he or she shall have been properly vaccinated, or shall have passed the period of incubation from date of last exposure.



# THE MARITIME SANITARY SERVICE OF THE UNITED STATES, AND THE RELATIONS OF NATIONAL AND STATE AUTHORITIES.

By STÉPHEN SMITH, A.M., M.D.,

*New York.*

THE Act of Congress approved March 3, 1879, entitled "An Act to prevent the introduction of infectious and contagious diseases into the United States, and to establish a National Board of Health," provides, among other things, that the National Board shall give "special attention to the subject of quarantine, both maritime and inland, and especially as to regulations which should be established between State and local systems of quarantine and a national quarantine system."

As at the period of the passage of this law there were only State and local systems of quarantine in existence in this country, it is proper to infer as follows : —

1. That Congress did not regard State and local systems of quarantine adequate to meet all the emergencies that had arisen or that might arise in the prevention of the introduction of contagious and infectious diseases into this country from foreign countries.

2. That Congress contemplated the ultimate establishment of a national quarantine system, and that it intended that such regulations should be made between State and local systems of quarantine and the national quarantine system as would secure harmony of action, and would give a complete and effective system of quarantine to the United States.

The motive to congressional action upon this subject was, undoubtedly, the great yellow-fever epidemic of 1878. Long before the regular session of Congress of that year, the popular agitation of preventive measures had become so absorbing and intense that the action of the National Legislature was inevitable. The prevention of future epidemics of this pestilence was no longer a matter of mere local concern, but was now suddenly lifted into the realm of national legislation.

Although the great question of preventive measures against future epidemics took precedence of all other subjects, Congress did little more during that short session than collect information, through a board of experts, as a basis of legislation, and establish, according to its suggestion, a National Board of Health, with power only to investigate causes of disease, collect information, and advise the departments of government on sanitary questions.

One of the subjects on which the board of experts reported quite fully was

the organization of a national quarantine system. It is reasonable to believe that the suggestions of this board had great weight with Congress, and led to the inquiry as to the regulations which should be established between State and local systems of quarantine and the national quarantine system.

During the extra session which followed the close of the regular session, Congress was compelled by the pressure of public sentiment to deliberately re-examine the whole subject, and make adequate provision to meet the contingency of the recurrence of the epidemic. The result of its deliberations was the passage of two additional Acts. In the first of these Acts, approved June 2, 1879, though no quarantine system is proposed, provision is made to meet defects in the existing systems of a most important character. The provisions were amplified by the Act approved July 2, 1879. In furtherance of the same object of perfecting measures of protection against the introduction of contagious or infectious diseases from foreign countries, Congress passed a joint resolution, approved May 14, 1880, authorizing the President of the United States —

“To call an international sanitary conference to meet at Washington, to which the several powers having jurisdiction of ports likely to be infected with yellow fever or cholera shall be invited to send delegates, properly authorized, for the purpose of securing an international system of notification as to the actual sanitary condition of ports and places under the jurisdiction of such powers and of vessels sailing therefrom.”

The invitation of the President, issued in pursuance of this resolution, was cordially responded to by twenty-eight nationalities. The conference met on the 5th of January, 1881, at Washington, and, during a session of two months, discussed some of the more important questions relating to international sanitary co-operation. There was great unanimity of opinion; and certain conclusions were definitely reached, which we feel authorized to consider as practically adopted, and a part of our national quarantine system.

An examination of the recent legislation of Congress shows that our quarantine system has undergone some very remarkable changes within the last three years. It has, in fact, been so enlarged in its scope, and in the methods of administration, as to have made State and local quarantines a branch of a far more extended system of operations. In this larger capacity the development of our sanitary maritime organization evidently tends to a system of combined national, State, and municipal defences against foreign pestilences of the most effective character.

It is the purpose of this paper to consider somewhat in detail the bearing of the recent Acts of Congress on our quarantine system, and thereby determine the regulations which should be, and, indeed, which have already been to some extent, established between State and local systems of quarantine and a national quarantine system.

It must be premised that the term “quarantine” should no longer be employed to designate the newly developed system, or, if employed, should be completely separated from its derivative meaning, and receive a new defini-

tion. It should no longer imply time, but should be a general and convenient term for a department of government devoted to the protection of the public health from the importation of contagious and infectious diseases. A better designation than "Quarantine" would be "The Maritime Sanitary Service." The duties of this service will no longer be the mere detention of vessels, cargoes, passengers, and crews, as a means of preventing the introduction of contagious and infectious diseases into the United States, but, under an enlightened management, it will aim to apply to ship sanitation all the resources of sanitary knowledge in order to render the great water-ways of commerce and travel free from danger to life or health, and to prevent vessels from ever being the generators or carriers of infection.

In sketching the several branches of this service it will be convenient and pertinent to examine them in the following order: 1. International co-operation. 2. The collection and distribution of sanitary information. 3. Maritime rules and regulations. 4. Maritime sanitary inspections. 5. The sanitary care of vessels arriving at the ports of the United States. 6. Co-operation of national and State authorities. 7. The organization of new, and the strengthening of defective, quarantines.

#### I. — INTERNATIONAL SANITARY CO-OPERATION.

Doubtless the greatest and most important advance made in arresting the spread of the graver forms of pestilential diseases has been in the co-operation of commercial nations in uniform and well-matured measures of defence and protection. The civilized nations of the world are beginning to realize that contagious and infectious diseases are the common foes of mankind, and that their carriers, whether persons, goods, freight, cargoes, or vessels, should be arrested, and relieved of infection before they are allowed to continue their travels. No commercial nation can adequately protect itself from the invasion of contagious or infectious diseases from other countries with which it is in direct communication, without either applying restrictive measures upon its commerce and travel, or securing the co-operation of other nations. This fact has come to be more and more realized in modern times, owing to the immense extension of the commerce of the world and the greatly increased facilities and spread of ocean and railway travel and traffic. In several instances nationalities have combined their efforts in well-concerted measures for mutual protection against the invasions of cholera and the plague, and the result has been most satisfactory.

In this country it has proved practically impossible to enforce preventive measures against the importation of yellow fever, owing to the failure, hitherto, to secure international co-operation.

Some of the most important features of the law of Congress, approved June 2, 1879, were rendered null and void by the indifference in some cases, and the actual hostility in others, of nations having intimate commercial relations with the United States. Secretary Evarts thus forcibly stated the facts in a memorandum transmitting the resolution of Congress inviting commercial



nations to an international sanitary conference. He says, "This resolution has its origin in the practical difficulties which have been encountered in the administration of the regulations and rules recommended by sanitary experience and framed by the legislation of the country to the end of preventing the introduction and spread of yellow fever, cholera, and other contagious or infectious diseases in the territory of the United States. The extensive prevalence of yellow fever in certain parts of this country during the past two years, and the almost continual existence of the danger of the introduction of such contagious or infectious diseases as yellow fever and cholera by vessels coming to this country from infected ports abroad, gave rise to such legislative measures; but the difficulty in their application has been chiefly owing to the fact, that in certain foreign ports where infectious or contagious diseases have existed, or were supposed to exist, the local authorities have shown some hesitation as to co-operating with the consular and medical officers of the United States in carrying out regulations deemed essential by this government as a sanitary safeguard. Moreover, in consequence of the vague and untrustworthy evidence obtainable in some cases as to the sanitary condition of suspected foreign ports, vessels coming thence to the United States have, in some instances, as it has afterwards appeared, been subjected to unnecessary quarantine in the ports of this country. On the other hand, vessels from non-infected ports of the United States have been compelled to submit to like unnecessary and vexatious delays by the quarantine regulations of other countries, based upon imperfect knowledge of the sanitary condition of American ports."

It is evident, therefore, that international regulations in the nature of treaties, designed to secure the co-operation of commercial nations in concerted measures for the prevention of the exportation and importation of pestilential diseases, are essential to any complete and effective system of quarantine.

The following important methods of international co-operation are desirable, and are now attainable, as is shown by the action of the recent International Sanitary Conference at Washington:—

1. The regular and systematic communication, among the contracting nationalities, of current information in regard to the public health of each, so far as relates to the existence or prevalence of contagious or infectious diseases, and the precise localities where such diseases exist.

This subject formed the principal topic of discussion at the recent International Sanitary Conference. Of the desirability of such information as a part of any organized scheme to prevent the importation of contagious or infectious diseases into a country, there was complete unanimity. The only difference of opinion occurred in the discussion of methods. It may be regarded, therefore, as a settled point in the system of international co-operation, that this proposition will be agreed upon.

2. An international bill of health, which shall be an accurate statement of the sanitary condition of the vessel, cargo, passengers, and crew, and of the public health of the port of departure and the neighborhood, and of the infectious and contagious diseases prevalent.

This subject was also fully considered by the late International Conference, and a form of a bill of health agreed upon.

## II. — THE COLLECTION AND DISTRIBUTION OF SANITARY INFORMATION.

It is not only necessary to an effective system of maritime sanitary service that there should be international co-operation, at least to the extent above indicated, but a branch of that service should be devoted to the collection of sanitary information, and its distribution among the officers of the service at home and abroad. If such information could be obtained as would present an accurate exhibit of the sanitary condition of all foreign countries, and of the principal cities, towns, and villages of the United States, and such information could be furnished immediately to all officers engaged in the maritime service, it is evident that it would prove of immense importance to the effectiveness of that service. For the accomplishment of this object Congress has made the following provisions : —

“It shall be the duty of the National Board of Health to obtain information of the sanitary condition of foreign ports and places from which contagious and infectious diseases are or may be imported into the United States ; and to this end the consular officers of the United States, at such ports and places as shall be designated by the National Board of Health, shall make to said Board of Health weekly reports of the sanitary condition of the ports and places at which they are respectively stationed, according to such forms as said Board of Health may prescribe ; and the Board of Health shall also obtain, through all sources accessible, including State and municipal authorities throughout the United States, weekly reports of the sanitary condition of ports and places within the United States ; and shall prepare, publish, and transmit to the medical officers of the Marine Hospital Service, to collectors of customs, and to State and municipal health officers and authorities, weekly abstracts of the consular sanitary reports, and other pertinent information received by said Board ; and shall also, as far as it may be able, by means of the voluntary co-operation of State and municipal authorities, of public associations and private persons, procure information relating to the climatic and other conditions affecting the public health.”

In accordance with this statute the Department of State has issued instructions to consular officers directing them to furnish to the National Board of Health the requisite information, and such information is now regularly received from all parts of the world. The Board of Health has, on its part, organized a system of correspondence and statistical mortality returns throughout the United States, which secures a body of information in regard to the condition of the public health of the ports and places, and of the great centres of population, of immense value to all sanitary authorities. This information, properly collated, with an abstract of the consular reports, and other pertinent matter, it transmits weekly to the authorities and officers specified in the statute. The following order has also been issued by the National Board : —

“Whenever any vessel shall leave an infected port, or, having on board

goods or passengers coming from any place or district infected with Asiatic cholera, yellow fever, or plague, shall leave any foreign port, bound for any port of the United States, the consul, consular officer, or representative of the United States, at or near such port, shall immediately give information thereof by telegraph to the National Board of Health at Washington, D.C., reporting the names, date of departure, and port of destination of such vessel."

The diffusion of this information has added largely to the efficiency of every branch of sanitary service in this country, and especially to that devoted to the prevention of the importation of pestilential diseases. No vessel can now leave an infected port without the fact becoming immediately known to the National Board, which at once notifies the health officer of the port of her destination.

### III. — MARITIME SANITARY RULES AND REGULATIONS.

One of the most important branches of a maritime sanitary service must be that devoted to securing the best sanitary condition of vessels, their passengers, cargoes, and crews. In order to accomplish this object, rules and regulations must be made, and enforced upon masters and owners at all times, and wherever the vessels may be. Congress has conferred upon the National Board of Health the power to make —

"Such rules and regulations as are authorized by the laws of the United States, and necessary to be observed by vessels at the port of departure, and on the voyage, where such vessel sails from any foreign port or place at which contagious and infectious diseases exist, to any port or place in the United States, to secure the best condition of such vessel, her cargo, passengers, and crew; and, when such rules and regulations have been approved by the President, they shall be published, and communicated to and enforced by the consular officers of the United States."

In compliance with this law the National Board of Health made the rules required, and communicated them to the consular officers of the United States. They therefore form a part of this maritime sanitary service of the country. They are designed to accomplish the following reforms on all vessels in foreign ports bound for any port of the United States: —

1. To secure perfect cleanliness of the vessel before the cargo is received.
2. To prevent any infected cargo or material being taken, or person from going on board.
3. To secure cleanliness and ventilation at sea.
4. To require adequate care of the sick on the voyage, and the complete isolation of an infectious or contagious disease which may occur.
5. To obtain sufficient space for passengers, so that there will not be overcrowding.

### IV. — MARITIME SANITARY INSPECTIONS.

The rules and regulations for securing the best sanitary conditions of vessels would be useless, unless enforced by proper and timely inspections. The



opportunity for such inspections occurs at but two places ; viz. (1), at the port of departure ; and (2) at the port of arrival.

1. At the port of departure or foreign port, the only person competent to perform the duty of inspection is the consul. And, being the officer who certifies to the bill of health, he is at once recognized as the person upon whom this duty must devolve. Congress accordingly has imposed upon consuls the duty of inspection, and of enforcing the rules and regulations adopted by the Board of Health. It may happen, that, at infected ports, the consul may require the aid of a skilled medical officer ; and in that case Congress has authorized the President to detail a medical officer to serve in the office of the consul at any foreign port for the purpose of making the inspection, and giving its certificates. At the present time the consuls of the United States are under instructions to make the required inspections, and at Havana a medical officer serves in the office of the consul. This new feature of our quarantine system, if rigidly carried out in all of its details, would prove a radical step taken to prevent vessels, cargoes, passengers, and crews from being the carriers of infection.

2. At the port of arrival the inspection must be made by the health officer. This officer is usually under the jurisdiction of the State, and his duty is to enforce the local quarantine regulations. Congress recognizes this fact, but also implies that its own jurisdiction should be co-ordinate with that of the State. The language of the statute is as follows : —

“ It shall be unlawful for any merchant ship or vessel from any foreign port where any contagious or infectious disease exists, to enter any port of the United States, except in accordance with the provisions of this Act, and all rules and regulations of State boards of health, and all rules and regulations made in pursuance of this Act.”

Evidently Congress assumed that the rules and regulations of the State, and those made in accordance with its own statute, would be in harmony, and that no conflict could arise ; for both State and national authorities were aiming, in their respective spheres, to accomplish precisely the same object by the same means.

It is very evident that much of the success of our quarantine system must depend upon an intelligent and thorough system of sanitary inspection at the port of arrival. If vessels which neglect to comply with the rules and regulations designed to secure their proper sanitary condition are allowed free admission to the ports of the country, one of the most important elements of an effective maritime service will be of no avail ; but, as it is for the highest interest of the State that its quarantine be so administered as to prevent the invasion of pestilential diseases from foreign ports, it must be assumed that the inspections of vessels at our ports will be efficient. That there should be harmony of opinions and practice between national and State authorities, the National Board of Health at the outset invited the principal health officers of the United States to its aid in preparing “ rules and regulations to be adopted and observed at all ports of the United States ; ” and the code of regulations agreed upon at this conference were such as their experience dictated.

## V.—THE SANITARY CARE OF VESSELS ARRIVING AT THE PORTS OF THE UNITED STATES.

Every system of maritime sanitary service is imperfect which does not afford all of the appointments necessary, not only to prevent a vessel arriving with a contagious or infectious disease on board from introducing that disease into the country, but to enable that vessel to be purified and returned in the shortest possible time to commerce. A quarantine establishment, fully equipped to meet every emergency, must have, 1. A location for the boarding and detention of vessels; 2. Quarters for the detention of passengers not sick; 3. Hospital accommodations for the sick; 4. Lighters, wharves, and warehouses for receiving and storing cargo; 5. A chief medical officer and such other officers or agents as may be necessary for securing the examination, cleansing, and disinfection of the vessel and its cargo, passengers, and crew; 6. Boats, apparatus, etc., necessary for administration; 7. Quarters for officers and men; 8. Burial-ground. It is true, that, at many ports of the United States, the more expensive equipments of such an establishment would seldom be put in requisition; but it is equally true that they might be required at any port. And it is the want of these facilities at critical moments that has resulted in the introduction of pestilences of the most virulent and fatal form. From personal inspection I am satisfied that there is not a State or municipal quarantine in the United States to-day competent to give an infected vessel, cargo, passengers, and crew that sanitary care which the exigencies of modern commerce and travel have a right to demand, and which science has proved expedient and proper: nor is it surprising that neither States nor municipalities have organized these establishments, which are so expensive in construction and maintenance, and so seldom absolutely required; and yet of their absolute necessity there can be no doubt. Every season the emergency arises demanding their employment at some point or points on our extensive coast.

The State and local quarantines of the United States, with two or three exceptions, are little more than boarding-stations, having no other facilities for the sanitary care of vessels than such as can be supplied and performed on board of each individual vessel. While these facilities are adequate to prevent the introduction of the mild forms of contagious and infectious diseases, as scarlet fever, measles, etc., they are not adequate when vessels arrive infected with yellow fever, or having cases of cholera on board. The former class of vessels can be sufficiently cleansed and disinfected in any harbor without danger to the communities adjacent; but vessels of the second class should never be allowed to touch the mainland until they, with their cargoes, passengers, and crews, are entirely free from infection. Such vessels should be treated in establishments located on uninhabited islands, and which have every necessary arrangement for treating the sick, for protecting the well while under observation, for storing, cleansing, and disinfecting cargoes, and for thoroughly overhauling every part of the vessel liable to retain infection, and

applying the necessary remedies. In order to supply this deficiency in our quarantine system, Congress passed the following enactment : —

“And the Board of Health shall have power, when they may deem it necessary, with the consent and approval of the Secretary of the Treasury, as a means of preventing the importation of contagious or infectious diseases into the United States, or into one State from another, to erect temporary quarantine buildings, and to acquire, on behalf of the United States, titles to real estate for that purpose.”

In accordance with the provisions of this law, and under the advice of competent counsel, and with the consent of the Secretary of the Treasury, the National Board of Health determined to supplement the defects of State and local quarantines, by establishing on insular positions, at suitable points on the coast, Refuge Stations for the special sanitary care of infected vessels, their cargoes, passengers, and crews. The principle which governed the action of the Board was this ; viz., 1. No vessel infected with yellow fever should be allowed to come to the mainland until it has been satisfactorily purified, and relieved of infection. 2. To accomplish this object, establishments should be provided on uninhabited islands, sufficiently remote from the mainland to prevent all possible communication of infection to adjacent communities, and equipped with every appliance necessary for the treatment of the sick, for the care of the well, and for the purification of the cargo and vessel. It was believed, that if a sufficient number of these thoroughly equipped stations were provided, so that every infected vessel bound to a port of the United States could be thoroughly purified before it approached the mainland, the purposes of Congress would be fulfilled, and a most important addition would be made to our national defences against the importation of foreign pestilences. Three stations were accordingly at once undertaken, and located at points where they were deemed most useful and immediately necessary ; viz., at Ship Island, on the Gulf coast ; at Sapelo Sound, Blackbeard Island, on the South Atlantic coast ; and at Norfolk, Va. The National Board proposed to provide at each station the following outfit : —

1. Places for boarding, detaining, cleansing, and disinfecting vessels.
2. Quarters for passengers and crews of infected vessels who are not sick.
3. Hospital accommodations for the sick.
4. Wharf, warehouses, and fumigating house, for receiving, storing, and fumigating cargoes.
5. Such medical attendance and supervision as is necessary for securing the examination of the vessel, its cargo, passengers, and crew, and for such cleansing and disinfection as may be necessary.
6. Boats, apparatus, etc., for the proper administration of the station.
7. Quarters for the officers and men.
8. Burial-ground.

The administration of these Refuge Stations is devoted exclusively to the sanitary care of such vessels, their cargoes, passengers, and crews, as voluntarily enter them *en voyage*, or are sent to them by the health officers of the neigh



boring coast quarantine stations. They are in no sense boarding-stations to intercept incoming or passing vessels. This latter function belongs exclusively to the State or local quarantines of the vicinity, and the Refuge Stations in no wise interfere with or supersede these establishments. Nor does the administration of these stations exercise any compulsory power over even infected vessels entering the coast quarantines. The latter may, if they choose, retain infected vessels, and require them to perform such acts of purification as they may direct. The Refuge is simply the national authority ready to co-operate with the State or local authorities to prevent the introduction of contagious or infectious diseases into the United States by thoroughly purifying infected vessels.

Viewed from the stand-point of experience and of sanitary knowledge, there can be no doubt that the State and local quarantines of this country can be made far more effective by the establishment and maintenance of a suitable number of properly located Refuge Stations to which infected vessels must resort for thorough purification before they are allowed to come into the harbors of the coast. Nor can there be the slightest conflict of authority. The State and local quarantines will perform the same functions as at present, only recognizing the Refuge as the place where infected vessels must perform quarantine on their own order; while the Refuge would be devoted to the proper purification of the vessels sent to it, and certification of their immunity from infection. Nor will this addition to our quarantine system prove embarrassing to commerce when fully developed, and administered in good faith by all parties. If, for example, Refuge Stations were located at Galveston, Ship Island, Key West, Sapelo, Norfolk, the Delaware Breakwater, New York, and Boston, the coast would be well provided with these establishments. Infected vessels coming from foreign ports would go to such a station *en route*, and undergo the necessary purification before attempting to enter any port. Such vessels would thereby undergo far less delay than at present, owing to the rapidity with which they would be cleansed.

The plan of Refuge Stations at convenient distances from local ports, now a part of our quarantine system, is not altogether new. The same principle enters into the quarantine system of Great Britain. Her coast is divided into convenient sections, and a general quarantine station is designated for each. For example, vessels arriving from certain ports, and bound to the ports of London, Rochester, Faversham, and any creeks or places belonging to or within any or either of the above ports, must perform quarantine in Standgate Creek. Again, such of them as shall be bound to the ports of—(thirty in number are mentioned by name)—shall perform quarantine in Whitebooth Roads, between Hull and Grimsby. In this manner all the ports of the kingdom are grouped; and a given place is designated where all vessels liable to quarantine, and bound to one of the ports in the group, must resort before attempting to enter the port of destination. Not only no hardship results to commerce and travel from this system, but it is the united testimony of masters and owners of vessels that the system greatly aids them in business.

## VI. — CO-OPERATION OF NATIONAL WITH STATE AND MUNICIPAL AUTHORITIES.

But Congress did not limit the co-operation of the national with State and local authorities to the establishment of these Refuges, but provided methods by which every local quarantine could be strengthened when necessary by national aid. The following clause of the law expresses the purposes of the legislative body : —

“The National Board of Health shall co-operate with, and, so far as it lawfully may, aid, State and municipal boards of health in the execution and enforcement of the rules and regulations of such boards to prevent the introduction of contagious and infectious diseases into the United States from foreign countries.”

This law has been construed by the National Board to mean, that whenever a local quarantine is defective in those particulars which render it inadequate to the proper sanitary care of uninfected vessels, and the State or municipality has no available means for that purpose, aid may be rendered by that Board to the extent of supplying the deficiencies. But in no case is the National Board authorized to construct and equip local quarantines for the purpose of rendering them competent to care for vessels infected with yellow fever or cholera. The establishments for this latter purpose must be provided separately, and each one must be so located as to meet the wants of many ports.

This is, therefore, a wise provision, and, properly carried out, capable of effecting important results. There are many small seaport towns that are very liable to be visited by vessels infected with yellow fever, but which have not the means necessary to make suitable provision for the inspection or care of vessels. A very small amount of aid to such ports at critical times has the effect of preventing the introduction of yellow fever into the country.

## VII. — ABSENCE OF QUARANTINE, AND INADEQUATE QUARANTINE REGULATIONS.

Finally, there remained two possible contingencies that might require the national authority to act to prevent disastrous consequences, owing to a lax system of quarantine. One was the possible failure of the State to create and maintain a quarantine at some important port ; and the other was the possible defects in the regulations of any existing quarantine. To meet these contingencies Congress provides as follows : —

“At such ports and places within the United States as have no quarantine regulations under State authority where such regulations are, in the opinion of the National Board of Health, necessary to prevent the introduction of contagious and infectious diseases into the United States from foreign countries, or into one State from another, and at such ports and places within the United States where quarantine regulations exist under the authority of the State, which, in the opinion of the National Board of Health, are not sufficient to prevent the introduction of such diseases into the United States, or into one State from another, the National Board of Health shall report the facts to the President of the United States, who shall, if in his judgment it is necessary

and proper, order said Board of Health to make such additional rules and regulations as are necessary to prevent the introduction of such diseases into the United States from foreign countries, or into one State from another, which, when so made and approved by the President, shall be promulgated by the National Board of Health and enforced by the sanitary authorities of the States, where the State authorities will undertake to execute and enforce them ; but, if the State authorities shall fail or refuse to enforce said rules and regulations, the President may detail an officer or appoint a proper person for that purpose."

By this provision of law, if the National Board of Health is vigilant, there can be no failure to maintain an unbroken and efficient chain of quarantine posts the entire length of our maritime coast.

#### CONCLUSIONS.

If, in conclusion, we group the several branches of this system of maritime sanitary service with a view to distribute the functions of the national and State authorities, we shall have the following exhibit : —

1. The national authority is required to secure, —

- (a) International sanitary co-operation.
- (b) The collection and distribution of sanitary information.
- (c) The preparation of maritime sanitary regulations.
- (d) The enforcement of maritime sanitary inspections in foreign ports.
- (e) The erection and maintenance of Refuge Stations.
- (f) The aid of State authorities.
- (g) The organization of quarantines where none exist.
- (h) The power to add necessary rules to any deficient quarantine.

2. The State authority is required to secure the organization and maintenance of efficient quarantine service at ports within the States.

This duty includes, —

- (a) The inspection of vessels.
- (b) Provision for the care of vessels not infected with cholera or yellow fever.
- (c) A competent health officer.
- (d) Making and enforcing rules and regulations governing the quarantine.

From this schedule of functions the conclusion is inevitable that our maritime sanitary service, though greatly extended, is practically one organization, and one department of public duty. It must of necessity be partly under national and partly under State authority, but there is nothing incompatible in the exercise of this authority by the separate governments. The system will be one complete whole when all its machinery is properly adjusted, and will work for the accomplishment of a given object, in which the nation and the State are equally interested. The end sought is the protection of the State and nation against the invasion of a common enemy. The national authority makes alliances for international co-operation with friendly foreign powers ; makes rules and regulations for securing the best sanitary condition of vessels,



their cargoes, passengers, and crews, and directs its consular officers to enforce them in foreign ports ; erects and maintains the strong outer defences, or Refuges ; stands ready to aid the States wherever and whenever they require or need assistance ; watches along the whole line of coast defences, and, wherever there is a weak or unprotected post, immediately supplies the needed force or aid. The State authority stations its sentinels at all of the approaches to its territory, who vigilantly examine every suspected vessel, and refuse admission to every ship which has not fully complied with the rules and regulations of its own and of the national authority. All vessels requiring only ordinary cleansing and care are at once returned to commerce, while the infected yellow-fever ships are sent to the nearest Refuge Station for an exhaustive purification.

From this review it is apparent that Congress, without in any wise disturbing the existing State and local quarantine systems, has made them an integral and essential part of a national system of quarantine, which, when fully developed, will be complete in all its parts. Legislation is still required to co-ordinate and complete all its parts. International co-operation should be extended so as to include general ship sanitation, and the creation of a system of Refuge Stations for infected vessels at points on the great routes of commerce with the tropics ; the system of home Refuge Stations should be completed, so that every infected vessel approaching our coast could find prompt care and certain relief without departing far from her accustomed route ; the local quarantines throughout the country should be placed under the jurisdiction of the State boards of health of their respective States. But if the same wise and enlightened statemanship, which has guided Congress and State Legislatures thus far in sanitary legislation, continues to perfect and enlarge our system of protection against foreign pestilences, in the near future the most efficient system of Maritime Sanitary Service which has ever been organized will be assured to the United States.

## VI.

### THE PREVENTION OF INSANITY.

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IN the State of Massachusetts, with a population of 1,238,110 in 1861 and of 1,783,085 in 1880, there were 604,677 deaths registered in the twenty years embraced within those dates ; 99,952 from pulmonary consumption ; 63,052 from the diarrhoeal diseases — cholera, cholera infantum, diarrhoea, dysentery, enteritis — 39,254 from pneumonia ; 30,088 from diphtheria, including croup ; 22,484 from heart disease ; 22,418 from typhoid fever ; 21,074 from scarlet fever ; 20,518 from accidents ; 13,557 from paralysis ; 10,730 from cancer ; 8,100 from apoplexy ; 7,325 from brain disease — not including other specified diseases — 7,078 from Bright's disease, including nephritis and kidney disease ; 6,088 from whooping-cough ; 4,368 from childbirth, 4,131 from measles ; 3,284 from small-pox ; 2,834 from rheumatism ; 2,145 from suicide ; 1,995 from insanity ; 1,838 from delirium tremens and intemperance.

Insanity, like alcoholism, therefore, occupies a comparatively low place in the mortality list, the deaths from it as compared, for instance, with the infectious diseases (95,886 deaths, excluding diarrhoeal diseases), being almost insignificant. The total number of insane people living in the State is smaller than the number dying from pulmonary consumption each year. Their death-rate is not so very much greater than that of people at the same age in the community at large. The deaths from typhoid fever or from apoplexy and paralysis together are ten times as many as from insanity ; from cancer five times as many ; from scarlet fever and diphtheria together twenty-five times as many ; from childbirth twice as many ; from drunkenness, and its very immediate results, not far from the same number.

If we compare the mortality rates from insanity for twenty years with those from some of the prominent causes of death, this difference is still more striking. The increased fatality from insanity, apoplexy, paralysis, and diseases generally of the nervous system, although less than from heart disease, and not much greater than from suicide, too plainly indicates where the strain from our complex and exacting life falls ; while our sanitary science has chiefly shown the results of patient and toilsome work in a reduction of the death toll from consumption and diseases chiefly due to filth and crowding.

Like the direct effects of drunkenness, therefore, insanity is not so much an evil in its destructiveness of life as in the calamities which are associated in various ways with it, the 20,518 deaths from accidents in the twenty years

representing a small amount of suffering as compared with the whole story told of the 1,995 deaths from insanity, whatever number of the 2,145 deaths from suicide belong there. Granting, for the sake of the argument, that even all suicides are insane (which certainly is very far beyond the truth), the deaths from insanity in the last twenty years are only one in 146 deaths from all causes, while the deaths from pulmonary consumption are one in 6.5.

*Table showing Death Rates per 10,000 of Population by Years and Periods of Five Years.*

	Diarrheal and Chief Infection Diseases.	Apoplexy and Paralysis.	Diseases of the Nervous Sys- tem.	Heart Disease.	Insanity.	Old Age.	Accident.	Suicide.	Childbirth.	Pneumonia.
1861 . .	54.07	5.58	16.96	5.99	0.49	8.94	6.89	0.74	1.71	10.37
1862 . .	52.22	5.23	16.39	5.70	0.53	9.13	6.28	0.73	1.14	9.15
1863 . .	74.40 63.88	5.90 5.77	17.89 18.06	6.55 6.18	0.49 0.52	11.10 10.04	6.56 6.66	0.53 0.62	1.23 1.53	13.76 11.89
1864 . .	74.08	6.30	20.29	6.14	0.51	11.28	7.56	0.51	1.30	14.29
1865 . .	64.64	5.85	18.80	6.51	0.50	10.74	6.02	0.61	1.26	11.78
1866 . .	45.10	5.74	17.91	6.48	0.81	10.42	6.83	0.56	1.50	12.57
1867 . .	41.50	5.59	17.06	6.51	0.83	10.00	5.97	0.55	1.44	10.28
1868 . .	49.45 46.46	6.82 6.35	18.90 18.37	7.14 6.67	0.67 0.72	9.49 9.90	6.48 6.55	0.63 0.60	1.50 1.59	11.97 11.77
1869 . .	48.18	6.61	18.17	6.47	0.61	9.70	6.52	0.64	1.77	12.25
1870 . .	47.47	7.02	19.04	6.73	0.71	9.90	6.06	0.62	1.72	11.78
1871 . .	44.13	7.38	19.10	7.72	0.59	10.39	7.70	0.81	1.53	12.43
1872 . .	70.37	7.83	23.61	7.98	0.57	10.85	7.48	0.76	1.74	14.97
1873 . .	61.85 60.88	8.20 7.82	21.20 20.85	8.00 8.00	0.56 0.63	10.64 10.39	8.40 7.79	0.74 0.80	1.91 1.76	13.34 14.67
1874 . .	51.35	7.49	19.86	8.08	0.62	9.61	7.92	0.71	1.81	14.81
1875 . .	53.72	8.20	20.46	8.23	0.71	10.48	7.47	0.96	1.80	17.79
1876 . .	58.70	8.06	19.85	8.32	0.88	10.05	7.74	0.72	1.67	13.60
1877 . .	52.72	8.53	19.56	8.42	0.68	9.56	6.15	0.98	1.19	11.89
1878 . .	46.01 49.44	8.73 8.75	20.60 20.74	9.05 9.07	0.92 0.79	9.57 9.59	6.29 6.71	0.75 0.82	1.28 1.24	13.02 14.37
1879 . .	42.12	9.26	20.79	9.36	0.69	9.30	7.01	0.93	1.01	15.99
1880 . .	47.56	9.41	22.88	10.21	0.80	9.49	6.35	0.74	1.02	17.25

The average death rates from insanity per 100,000 of the living inhabitants in periods of five years from 1861 to 1880 are 5.24, 7.24, 6.32, 7.92 ; or 6.24 and 7.12 for the two periods of ten years, whereas the increase in the numbers of admissions to Massachusetts insane asylums in the twenty years was from 846 in 1861 to 1,610 in 1880, and in the number of patients remaining in the asylums at the end of the year from 1,503 to 3,168. The proportion of those in asylums to the general population rose in the same time from 12.13 to 17.51 per 100,000.

From these figures it is evident that there is an increase in insanity, but much less than would appear from a consideration of the asylum statistics alone, the facts being that there must be one insane person to each 350 of the population in Massachusetts ; that comparatively few would be out of asylums if a comfortable one were near at hand to each and all ; that up to the point of accommodating nearly 5,000 persons, insane asylums in that State, if easily accessible, would be filled nearly as fast as they might be finished, and that the great increase in the known numbers of the insane is due more to better enumeration than to an actually greater number of the insane in the community.

If we seek to ascertain from what part of the population the greatest amount of insanity comes, we learn from the accurate statistics of England



that of the 36,762 insane known to the Lunacy Commission in 1859, there were 31,782 paupers, or 86.45 per cent., as compared with 4,980 or 13.55 per cent. supported by themselves or their relatives. In 1881, of 73,113 insane, 65,372, or 89.41 per cent., were paupers, and 7,741, or 10.59 per cent., were private patients or self-supporting. The increase in the number of the latter in twenty-two years was 20 per cent., and of the pauper insane 50 per cent., while general pauperism was rapidly diminishing. It is difficult to form any exact estimate of the proportion of the population at large from which the pauper insane come, but it is manifest that the causes contributing to the production of insanity prevail in England more at the bottom of the social scale than at the top.

Similarly, of 9,541 admissions to the State hospitals for the insane in Massachusetts from 1871 to 1880, inclusive, 4,166 were State patients 4,050 supported by cities and towns, and 1,325 private patients, or 86 per cent., were supported by public charity. Of 7,963 admissions in the same time, too, 4,532 were natives, and 3,430 foreigners, respectively 57 and 43 per cent., whereas by the census of 1875 the natives constituted 74.64 per cent. of the population, showing more than twice as great a percentage of admissions among foreigners as among natives.

There were admitted 9,381 men and 9,041 women in a longer period of years than ten; of 17,354 there were 7,435 married, 8,193 single, 1,620 widowed or divorced. Of the 9,381 males, 2,215 were laborers, 1,357 farmers, 313 clerks, 62 clergymen, 59 physicians, 43 lawyers, 201 students, of whom 114 were in school. Of 4,673 females, 52 were school girls. The enormous number of 166 boys and girls were of the school age, where insanity is seen by the next table to be extremely uncommon — more school boys than lawyers and physicians together.

*Of 18,422 Admissions<sup>1</sup> to Massachusetts Insane Asylums the Ages were as follows: —*

Age.	Number of Admissions.	Population by Census of 1875.	Admissions per 100,000 of Population.
15 and under	366	312,103 <sup>2</sup>	117
15 to 20	1,380	165,936	832
20 to 30	5,269	310,861	1,695
30 to 40	4,632	240,966	1,922
40 to 50	3,372	182,823	1,789
50 to 60	1,797	126,430	1,421
60 to 70	976	79,186	1,106
70 to 80	382	38,283	997
Over 80	58	11,167	519
Age not known.	190	10,302	—
Total . . . . .	18,422	1,651,912	1,115

<sup>1</sup> Taken from condensed tables for different numbers of years from asylum reports. The percentages, therefore, serve *only* for comparison of admissions at different ages.

<sup>2</sup> Excluding those under five years of age.

Insanity not only prevails at a time of life when the strain of mind and body is great, but also in those places where the effort is the most intense. That fact is strikingly shown in the distribution of insanity over the State in the large and small towns, being greatest where the concentration of population brings with it extremes of poverty and wealth, as indicated by the following table.

The figures for the Northampton and McLean Asylums represent persons; for the others, admissions, excluding transfers from other asylums. There are many sources of error in such a computation, but the general result shown is probably not far from the truth. The great excess in Boston is due largely to having a well-known hospital near at hand, and other facilities for easy commitment.

*Number of Insane Patients (town and private) admitted in the McLean, Boston, and State Lunatic Hospitals per 100,000 inhabitants, from 1871 to 1880, according to size of towns : —*

No. of Towns.	Population.	Inhabitants by Census of 1875.	Insane Patients.	Insane Patients per 100,000 Inhabitants.
341	The State.	1,651,912	5,689	344
1	Boston.	341,919	1,987	581
12	20,000 to 50,000	405,655	1,486	367
42	5,000 to 20,000	367,957	1,193	324
286	5,000 and under	536,381	1,023	190

Although insanity constitutes so small a factor in our death rate, the homicides by insane people would very largely swell the number of deaths properly due to that cause; and it is by no means unlikely that the great misfortune recently suffered by the country in the murder of our Chief Magistrate by a lunatic may attract attention to the proper treatment of the insane and the prevention of insanity, just as the severe illness of one of England's princes from typhoid fever did more towards the prevention of that disease and the study of its causes than the labor of many sanitarians for many years. But the causes of typhoid fever are tolerably clear, whereas the antecedents of insanity are complex and obscure. If we look over the list of alleged causes of mental disease in the reports of our insane asylums, we find that they vary according to the theories of the medical officers recording them. So numerous are the conditions associated with it that it is very easy and natural to pick out that one which most conforms to one's preconceived opinions. There is, however, a general agreement that whatever the real causes, they are, as a rule, long standing and of very slow development.

In our Massachusetts asylums drunkenness and its effects upon offspring stand easily first — an evil of such magnitude that it is difficult to overestimate it, and yet a quarter of a century of earnest work to mitigate it has resulted in hardly more than educating public opinion to the point of

groping still more earnestly in the dark for some means of reducing the curse to at least controllable limits. "Ill health" has been advancing, as our population has become more concentrated, until it now occupies the second position in the list, as a "cause of insanity."

According to different observers in various countries heredity causes from four per cent. to ninety per cent. of all the cases known. There can be no doubt that it is one of the most potent and most frequent direct causes of insanity, to such an extent that if replying exactly to the frequent inquiry, "Doctor, how do you explain my son's disease?" the expert can only say, "It is the logical result of *your* marriage and *his* bringing up. I do not mean to assert that insanity once appearing in a family is there forever. Far from it. Like pulmonary consumption, it can be eliminated by simple attention to the plain laws of health.

There are two points to be kept in view in the prevention of insanity. First, the avoidance of an accumulation of the chronic insane by cure of the disease in its early stages, and, secondly, the prevention of first attacks of mental disease.

In the first regard I think we can thus far claim almost nothing, perhaps from the nature of the malady, but to a certain extent, I am inclined to think, from our method of treating it. One of the most certain means of firmly establishing incipient pulmonary disease and creating incurable consumptives would be to place every one with a cough in a hospital with several hundred others in all stages of the disease. In fact, we drive just such cases out of the hospital, no matter if to live almost in a hovel. Is there not something analogous in the timid young woman or the busy man, shut up in idleness with people, three fourths of whom are incurably mad or demented, so far as the chances of cure are concerned? And yet the irresponsible condition of many of them, for the time being, compels us to at least put them in a place of safety. It seems to me that one of our greatest needs at the present time is a number of small hospitals for the early scientific treatment of curable insanity, and next in importance is such a general knowledge of mental disease as to secure its proper treatment at home in the first stages by the physician.

We boast of our humane methods of dealing with the insane in modern times, but are we entirely sure that it is always more humane to shut people up in gloomy wards and do absolutely nothing for their treatment except to compel them to live in spite of themselves, and prolong misery which otherwise would soon end in a quiet death? This, however, which has chiefly to do with the accumulation of the chronic insane and the very difficult problem of adequately providing for them, is very largely a question in social economy, and does not so directly interest us as physicians and sanitarians as the prevention of the first attack of insanity.

If the causes of insanity are generally remote and only to a moderate extent entirely external, as from sunstroke, rheumatism, injury to the head, fevers, etc., its prevention should begin at birth or even earlier. The duty of the child to the parent is often and fully insisted upon, but the parent's duty to the child is less instilled into the minds of rash people about to



marry. We do not live in Plato's republic or in an ideal world, where the marriage relation can be regulated by law ; nor, with our present knowledge, is it likely that we could so control marriages, if we had the power, as to produce much better results than now exist in the reproduction of the race. So many factors, of whose workings we know almost nothing, are concerned in building the brains of a people that marriages which our theories would impel us to forbid are, as a matter of fact, often the happiest in their offspring ; and what we might think ideal unions are sometimes blasted with children that are only a sorrow. There is a limit, however, beyond which we can say that marriage is a wrong to society, if not almost a crime to the children, and where we can safely predict a large measure of mental or physical defect and disease as its result. Such marriages are encouraged, now and then, to rid the adviser of a patient with an infirmity which would much better die with him than be left as a legacy to his heirs.

It is undoubtedly, though, a great mistake, which conscientious people make over and over again, to suppose that marriage must not be entered upon by any person with presumed hereditary predisposition to disease. On the contrary, a judicious marriage, based upon judgment and esteem rather than upon emotion and impulse, is to be encouraged as the relation most conducive to mental rest and happiness, and therefore health to the individual, and in carefully selected cases as not dangerous to the welfare of the progeny. Give nature a chance, and the tendency is always towards health and to eliminate disease.

There are many cases of disease of the mind which are, like lung fever, self limited, pursuing a tolerably definite course, rather acute, and whose cause is at present so far a mystery that we cannot explain it, falling, as insanity sometimes does, where we should least suspect it, often upon those members of a family who would appear the most likely to escape it. More commonly we find a chain of causes extending over a long period of years, or a slight tendency from birth, in both of which series of cases we have every reason to believe that reasonable preventive measures taken early would have been successful.

The hygiene of infancy is a most important matter in this respect, simple, nutritious, non-stimulating food, by all means breast milk, the mother's if possible, clean air, pure water, plenty of sleep ; in childhood the same general principles, avoidance of too early study, removal from all impure associations and suggestions, and careful training in those habits of self-control, self-reliance, devotion to duty, and calmness, which are to be of so much value in later life. In boyhood and girlhood comes first the danger from confinement in the bad air of school-rooms, and then the hurry and worry, and strain of six, seven, or eight branches of study, competitive examinations, prizes, want of out-door exercise, insufficient time for meals, evening study, morning languor, and, after a few years, the break-down with which so many of us are already too familiar. When the strain of the school is superadded to the excitement of late parties, the smash comes only so much sooner. The nonsense of stuffing the brain to secure a fine mind is so general that teachers of private schools assure me that it is very difficult to

convince their patrons that their children are not neglected when they have only three or four studies at a time to master thoroughly, without fret or confusion. Such intelligent teachers have to constantly protest against the rush of the father and mother to overload their children's heads at the expense of their health.

Few girls and boys pass through the critical years of development into womanhood and manhood without neglect, more or less, which in after years many of them most bitterly regret in recalling the many violations of nature's laws, which a little knowledge would have enabled them to avoid. At this time of life, more than at any other, they need the sympathy and tender help of parents and teachers. The maturing young woman is watched with a solicitude by the few careful mothers that suggests the dangers run by those less fortunately placed in life, while the young man is usually left pretty much to himself in his struggle with the mysteries of his developing nature, most happy if he chances to find a true adviser to keep him up to the highest standard of which he is capable. The bad habits into which boys and less often girls fall are not of themselves often the immediate cause of insanity. They act chiefly and very strongly toward producing mental disease when the strain comes of recognizing the fault, of reviewing the past, and trying to escape the evils which a morbid imagination or a charlatan's advice places before them.

Except in so far as purity in all one's relations in life develops self-control and character, we cannot place a considerable chance of insanity before those who adopt lives of leisure or licentiousness. Their evils come chiefly in a different way, and even syphilis must be acknowledged to be a rarer cause of insanity than the enforced celibacy which our civilization demands or the excesses which marriage sometimes allows. That the impure relations of the sexes is, in various ways, at least one of the prominent factors in producing certain forms of insanity is conceded, and that the more the danger is diminished of loathsome disease, so much greater is the temptation to improper indulgence, is a fact perfectly familiar to any person who knows much of young men. I do not myself believe that syphilis, whether producing insanity or not, is innocently propagated to such an alarming extent as has been supposed, or indeed often enough to make restrictive laws necessary. Indeed, after a somewhat careful study of the license system in France, Germany, and parts of England, I am convinced that such regulations do very little good in preventing disease except in case of soldiers, who are otherwise also under sanitary control.

The table showing the great excess of insanity during the most active years of work, indicates clearly how well the foundations of health must be laid in early years to bear the strain of work and worry that are the inevitable lot of the vast majority of men and women. Even at that susceptible period of brain-activity the chances of mental disease may be very much diminished if time enough is taken for food, healthy exercise, sleep, and recreation. A large proportion of the patients coming to an asylum have the history of hastily bolted breakfasts and dinners, of badly cooked food, or pies and doughnuts and tea, in place of simple nutritious food, that really

need not cost so much as that which produces dyspepsia and innutrition, of years spent at the desk, of a mind stimulated to over-activity and sleeplessness, or of monotonous toil without recreation. If we condemn the abstemiousness and hardness of New England life, and attribute a certain amount of insanity to its asceticism, it might not be easy to stop this side of self-indulgence and the jovial hilarity that gives rise to the insanity of too much rum and beer. *In medio tutissimus ibis* is easy neither here nor elsewhere.

It is well enough to preach moderation in all things, when most men are willing to take the risk of the over strain, which they think small in their own case, until the unsteady mind refuses to act naturally, and an attempt is made to bridge over the crisis with chloral and bromides and opium and stimulants, instead of getting permanent help from rest and food and change of scene. It must be granted that such a course seems to succeed for a time often enough to make its practice not uncommon, for pure work without emotional strain or anxiety oftener causes other troubles than insanity.

For that insanity which appears in families of illustrious talent, and seems almost like the disorder of an organization too nice for our rough lives, the world has compensation in the genius of some of their members, while the suffering to the individual seems often to show in stronger relief the beautiful outlines of a noble nature or an exquisite fineness of mind.



## VII.

### HISTORY OF THE NEW ORLEANS AUXILIARY SANITARY ASSOCIATION.

By EDWARD FENNER, Esq.,

*New Orleans, La.*

MR. PRESIDENT AND MEMBERS OF THE ASSOCIATION, — The formation of an organization similar in its aims and purposes to the New Orleans Auxiliary Sanitary Association has only been possible in the last quarter of the nineteenth century.

No voluntary organization with similar far-reaching and comprehensive aspirations has ever before been undertaken.

For its creation and support it needed precisely the conditions which existed in the city of New Orleans notably in the spring of 1880.

The yellow-fever epidemic of 1878, although not more widely spread, nor from the malignancy of its type more destructive of human life than many that have preceded it, created, as stated in the Proceedings of the Sanitary Council of the Mississippi Valley, "an uneasiness and alarm among the people of the entire valley lest the approaching summer may witness another visitation of yellow fever," etc., which resulted in the organization for their protection of that, to New Orleans, menacing body.

Apart from an earnest desire to prevent a recurrence of the sorrow and misery inflicted on numberless households by the dire visitation, the people, as never before, were convinced that unless the most energetic measures were taken to remedy the evils of past municipal neglect, the vast and increasing commerce conducted within the city limits was threatened with ruin.

Successful business requires for its prosecution popular repose, whether it be in the form of freedom from civil or national turmoils and wars, or from panics engendered by the sudden outbreak of a malignant and mysterious disease. In the face of the first danger the merchant or financier, to avert its evils, puts forth every effort, and unhesitatingly resigns a portion of his wealth that the remainder may be preserved.

Why should he be supine and listless at the approach of a foe, though intangible, much more to be feared in its destructive power than a mob or the army of an invader?

While these may work a temporary devastation, their traces are evanescent, and commerce quickly resumes its accustomed channels. When a menacing plague is ever hanging over a city, like the sword suspended above the head of Damocles, confidence vanishes, capital, timid and sensitive, is withdrawn, and business languishes and dies.

Experience has taught the merchant that it is as important to his success

to avert disease and preserve the public health as it is to maintain tranquility and order.

Thoroughly alive to this fact, and enthusiastic in the belief that by proper effort New Orleans may be made as healthy as any city on the continent, its merchants and their enlightened fellow-citizens of all professions are united in the determination to effect this purpose.

What is the nature of the organization they have perfected to this end, its history, method of working, etc., will form the subject of my brief paper.

As stated in an "Address from the Auxiliary Sanitary Association to other Cities and Towns," published in June, 1879, the causes which inaugurated this movement were the manifest existence of every crying nuisance in our midst, the recognized inability of our civil authorities and Board of Health, for want of means and lack of power, to secure their abatement, and the wide-spread conviction of the absolute necessity for improved sanitation and hygienic reform.

These subjects, discussed at first socially by a number of our thoughtful and intelligent merchants, soon assumed publicity in the form of a call to the citizens of New Orleans, which saw light in the public prints March 31, 1879.

From the above it will be perceived that it was the first intention of the founders of the New Orleans Auxiliary Sanitary Association to attempt the work of reformation through the instrumentality of a "Committee of Citizens." Owing to the rapidity with which this call was signed by several thousands of citizens of all classes, the little nucleus of merchants, around whom the people so spontaneously gathered with implicit confidence that whatever measures were by them adopted would prove beneficial, determined to erect upon this substantial foundation of public faith an edifice that will endure until all known avoidable causes of disease and death, and every insanitary hindrance to human progress and commercial prosperity, shall be abated or removed.

This determination was announced to the people at a mass meeting, held at Odd Fellows' Hall.

Permanent organization was effected by the adoption of the name, "New Orleans Auxiliary Sanitary Association," and the election of a president, nine vice-presidents, treasurer, secretary, and corresponding secretary.

On the 12th of April, 1879, a charter was obtained from the State of Louisiana. Article 1 of the charter provides that "The purposes and objects of this corporation are hereby declared and specified to be the execution of such measures as are or may be necessary for the preservation of life and the public health, and to prevent the introduction or spread of diseases, and to these ends to aid and assist the public authorities in carrying into effect all proper ordinances or laws relative to public health, and to adopt systematic measures for the collection and proper distribution of money or property derived from voluntary subscription or otherwise in such manner as will best tend to preserve life and property, and promote the prosperity and health of the city of New Orleans."

At the first meeting of the members of the Association an executive committee were selected, whose duties were defined in the by-laws.

From what has been stated it will be apparent to the members of this body that the Sanitary Association, all of whom were non-professional men, had undertaken a task surrounded with innumerable difficulties, and far exceeding their ability, unaided by professional skill of a high order, to conduct with credit to the Association and lasting benefit to the city.

A "committee of citizens" might not go far wrong in their unaided efforts to abate certain well-known insanitary evils by the erection of works designed to flush the gutters of the city with the fresh water of the Mississippi River; in contriving and building the improved garbage boats, so fully described in the paper read by Hugh Miller Thompson, D. D., at your seventh annual meeting; the improvement of the draining canals, and works of like character. But the Sanitary Association had assumed to perform the hygienic work of a Board of Health.

It depended upon a well-grounded public confidence for the support of a movement so novel in its aims. The need of large contributions toward objects of paramount interest and importance was foreseen.

It was felt that the judicious use of money in collecting and diffusing sanitary information would develop and vitalize an overwhelming sentiment favoring sanitary reform, which, from the lack of positive and active leadership, lay dormant with the people.

These considerations and this assumption of grave responsibilities influenced the Executive Committee to fill the chair of Sanitary Director by one thoroughly versed in the science of preventive medicine and familiar with the medical jurisprudence of the State of Louisiana.

Without a dissenting voice your honored president, Dr. C. B. White, whose able management of our State Board of Health from 1869 to 1876 had given him an unquestioned reputation as a sanitarian, was elected Sanitary Director.

The opportunity for improvement enjoyed by the lay members, from the intelligence and long experience of their Sanitary Director, and his zealous coöperation with the Executive Committee, has steadily increased its working power.

It is worthy of record that within the three years of active effort to improve the sanitary condition of the city, during which period an immense amount of practical and theoretical work has been undertaken and successfully accomplished, the most perfect concord has existed, not only in the deliberations of the committee, but in the distribution of labor imposed upon and cheerfully performed by men engaged in other time-absorbing pursuits.

Much of this unity of purpose may be attributed to the fact that by a resolution early introduced no discussion foreign to the purpose for which the Association was created is permitted; and, further, unlike political bodies whose members are elected or appointed, not because of their special fitness for the duties they are called to perform, but by reason of their political influence or power, the members of this body were drawn to the work by motives purely patriotic. They are free from all political entanglements; they neither seek nor expect preferment to result from their voluntary and unpaid labors.



In the words of the stirring address by Hugh Miller Thompson, D. D., to the people of New Orleans: —

“The only reward desired by those who founded this Association, and will for the present direct its efforts, is the approbation of their own conscience, and the earnest hope that when their work is completed it can be said of them, ‘Well done, good and faithful servants.’”

The important and difficult task of organizing for active work having been accomplished, an “Address to the Citizens of New Orleans” was issued.

At this stage it became the duty of the Finance Committee to devise ways and means for the execution of the great and costly works of sanitary necessity recommended in the address, the accomplishment of which, through the aid of public contributions, justifies the assumption advanced in the introduction, that the New Orleans Auxiliary Sanitary Association, when contrasted with other bodies of similar name, wherever located, is in its aims, method of working, and the great and costly nature of its undertakings, wholly unique.

The deliberations of the Executive Committee disclosed the necessity of an immediate house to house inspection, to be followed by a perfect cleansing and disinfection of premises, far in excess of the financial ability of the State Board of Health to execute; a radical reform of the defective and dangerous mode of removing garbage; the invention of an effective and permanent plan for the flushing of the street gutters with river water.

It was roughly estimated that these measures, if wholly executed, would require no less a sum than \$100,000. The Finance Committee, therefore, issued a call for contributions.

I have endeavored to recount in regular sequence the various steps that have been taken to organize the New Orleans Auxiliary Sanitary Association. In doing so it was necessary to quote several of the most important papers that have been addressed to the citizens. These addresses not only gave form and motion to the body, but with a unanimity seldom witnessed when matters of grave import are first presented, novel in form and demanding pecuniary aid, united them in the belief that the hygienic condition of the city deserved their first consideration.

The limitation set by your rules, coupled with the fact that this paper was prepared far away from the archives of the Association, precludes the narration of its achievements during the three years of its existence, and their influence on the health and prosperity of the city of New Orleans.

With permission from your honorable body I propose to read a paper at your tenth annual meeting descriptive of the work that has been performed. I hope also to demonstrate how much the Association has been indebted for its successful career to the unselfish and united efforts of the men of New Orleans.

I think it a fitting occasion now and here to make acknowledgment of the intelligent coöperation extended to it by the ladies of the city. The members of the Sanitary Association cannot be too grateful that this potent feminine influence has been extended in their favor.

Moreover, the same interest has been manifested in other cities ; of this we have a practical illustration in the generous contribution to its treasury by an illustrious philanthropist, a lady of the city of New York.

In conclusion, I quote from a speech made by Mr. Albert Baldwin, chairman of its Finance Committee, delivered on June 21, 1881, as showing the earnestness and persistency of the members of the Association : —

“FELLOW CITIZENS: The Sanitary Association exists to-day, in its third year of unflagging effort, in the prime of life and vigor. The members of 1879 are with us still ; with a firm purpose they have devoted their time and money, and whatever intelligence God has gifted them with, to fight against rife causes of disease. Imperfect drainage, filthy streets and gutters, foul and ill-constructed canals, low lots and places, a meagre water supply, a vile privy system, the rapid removal from our midst of all refuse matters, tending, under our hot sun, to produce and spread disease — are matters which engage their attention. Just so long as the citizens contribute the material aid required, they can rely upon the best efforts of the Association to continue the war against every enemy to the material prosperity of the Crescent City.”

## VIII.

### THE MUNICIPAL ORGANIZATION OF THE AMERICAN PUBLIC HEALTH SERVICE.

By EUGENE FOSTER, M. D.,

*Augusta, Georgia.*

MR. PRESIDENT, — The successful application of the principles of preventive medicine depends upon organization or community of action. In order to the proper administration of this science there are three organizations or separate bodies — mutually dependent upon each other — which must be formed and operated before any material advance can be made in this field in America. These three organizations are Municipal, State, and National Boards of Health. The great cardinal distinction between them is that municipal boards have to deal with those units of sanitary administration, the individual and the domicile ; the last two, State and National, have an entirely different scope and purpose — they deal with general considerations of health problems, and regulate or seek to control those agents of disease which strike at the community at large — the State or the Nation. To the mind seeking results it is plain that without proper organization of the local or municipal Boards of Health there can never be an effective State or National Board. The mother country, England, appreciating this fact, has given us the general plans of organization which must ever be the basis of sanitary administration for all civilized nations. Examined briefly, we find that England is divided into 1,500 sanitary districts, each district presided over by a learned medical officer of health, each board clothed with almost unlimited powers to promote or secure the public health, all recognizing the central authority of the local government board, and each district board being directly responsible to the central authority. In that country, ever jealous of the rights and liberty of her citizens, we find powers given to these boards of health that our average politician would view with alarm in great and free America. Recognizing the fact that the maintenance of the public health in its last analysis depends upon properly organized and operated local sanitary authority, the additional fact must be admitted that such boards should be constituted under full legal authority and clothed with powers necessary to secure their successful administration of the science of preventive or State medicine.

These propositions being admitted, let us examine the municipal health service of this country and see if, under the present organization of these boards, they may legitimately or rationally be expected to secure for us the great and countless blessings which so surely follow a proper administration of this vital and special department of government. The basis of this analysis is formed upon information secured from one hundred and four Boards



of Health by circular letter addressed to every Board in America. To bring this information within a systematic field of examination the following tabulated statement is presented:—

Question 1. Is your Board organized under State or city law?

State law, 56; city law, 48.

Question 2. Has your Board plenary powers in health matters?

52 have; 52 have not.

Question 3. Are your health ordinances enacted by your Board or the City Council.

52 by Board; 52 by City Council.

Question 4. Are the sanitary inspections of your city made by regular inspectors or by policemen?

Regular inspectors, 36 cities.

Police force on general duty, 15 cities.

Police, special detail from, 5 cities.

By Board of Health, 17 cities.

By Health Officer, 7 cities.

By City Physician, 2 cities.

By Committee of Town Council, 1 city.

Question 5. How often each month or year do your inspectors inspect the city?

36 cities, inspectors constantly at this work of systematic inspections.

32 cities make no systematic inspections; among this class are four of the largest cities in the United States; 7 cities make 1 yearly inspection, one of these is fourth or fifth largest city in the United States; 5 inspections twice yearly; 1 inspection 3 times yearly.

Question 6. Are your inspectors on duty all the year?

In 45 of these one hundred and four cities inspectors are elected to serve the whole year, but in twelve of these no inspections are made except when complaint is rendered.

Question 7. Have you a book in which the condition of each lot is recorded at every round of the inspector?

4 Boards answer, Yes.

Question 8. What is the duty of inspectors when nuisance injurious to health is found?

43 cities, "Report to Board, Mayor, or Town Marshal."

46 cities, "Order abatement."

Others do not answer this question.

Question 9. Has your Board printed regulations governing your inspectors?

33 answer Yes; 71 No.

Question 10. Has your Board or City Council enacted a code of sanitary laws.

51 answer No; 53 Yes. In most of the latter class the codes consist of a few disjointed health laws almost entirely upon quarantine of yellow fever.

Two other points are taken from a paper by Dr. J. M. Toner, who tabulated returns from 137 Boards. They are: How often does your Board meet?

15 quarterly; 33 monthly; 14 bi-weekly; 15 weekly; 47 meet under following circumstances: No regular time, on call, very seldom, at will, when necessary, at call of president, only as required, at option, when complaint is rendered, when a case is reported, no stated meeting, irregular intervals, at call of the mayor, etc., etc.

What vital statistics does your Board register?

87 of these 137 Boards say they keep no register of vital statistics — not even a record of deaths is kept.

A proper examination will show that fully twenty per cent. of these Boards have not a single physician in their membership or employ. The vast proportion are composed of politicians, many of whom serve for but one year. Indeed, the term of membership in nearly all of them is one year. It will be further demonstrated that in many of them the mayor of the city, the town marshal, or a policeman specially detailed, is filling the responsible position of Health Officer.

With all this chaos — want of authority by Boards of Health, unqualified persons filling the vast majority of them, want of organization or system in membership or officers, no unity of action among Boards, each literally toting its own skillet; many of them never holding a meeting until disaster is impending or already upon them; in eight tenths epidemics of small-pox, scarlet fever, measles, whooping cough, cholera, etc., run riot through the community without an intelligent effort to prevent or control them having been made by systematic vaccination of the people, by isolation of the sick, disinfection of infected houses or materials such as clothing, bedding, etc., withdrawal of children from school where they come from families where these diseases are prevailing; in many of the cities a system of sanitary police in operation which would be discreditable to a heathen; no system of sewerage or drainage; potable water secured from wells fearfully polluted with human excreta by hundreds of privy vaults dug to the water line of these wells; streets and lots filled with all sorts of garbage and covered over with a few inches of dirt; want of scavenger service (for such as they have amounts to nothing, leaving excreta of man and beast, dead animals and all manner of filth piled high in the lots and streets, and not removed for weeks upon weeks), — I ask calmly what can be expected of such a health service? Remember also that in addition to this state of affairs where boards are in existence, there are cities and some States where no organized effort to protect the health of the people is claimed to be in operation. From many cities comes the familiar refrain, "We had a Board of Health which was quite active during a threatened epidemic of yellow fever, but when impending danger had passed the Board went into winter quarters and has remained there ever since."

From these data it is evident that the defect in this scheme of disease prevention and life saving is a want of proper organization. I grant that here and there a board may be found fully alive to its duty, but the fact, is undeniable that the efforts of these sanitarians of the country at large are wholly incommensurate with the vast field of their labors. Let this be realized, and then go forth with the lesson fully impressed upon you, that organization is the corner-stone of this magnificent edifice — not organization

in the household only but in the village, the city, the metropolis, the State, the Nation. Let it be organized with such proportions as are firmly established in other departments of the various governments, and of such intelligence and activity as shall make it a blessing to the people, and creditable to this age of marvelous progress in civilization. I respectfully invite your attention to the organization of local boards of health, — their powers and scope of action. The proper organization of a local or municipal board of health involves a few plain and rational principles, which are mainly embraced in the following deductions : —

(1.) A law giving plenary powers to the Board in all health matters within the local territory. This law to be obtained from the Legislature of the State, not from the City Council.

(2.) A majority of the members should be practicing physicians, who with the Mayor, one member of the City Council, an analytical chemist, a civil engineer, and a lawyer should constitute the municipal Health Board. The members should be selected with sole reference to qualification, and the physicians be indorsed by the medical profession of the city.

(3.) The term of membership should be six years, and so arranged that the term of only a minority shall expire yearly. Thus you secure somewhat of continuity of skilled members. The same principles should govern the term of all subordinate officers executing health laws.

(4.) As the financial status will largely determine the value of the Board for effective work, it should have authority to require sufficient appropriation of funds from the city treasury, as the Board in the exercise of a sound economy may deem necessary. If the estimate is deemed excessive by the City Council the matter to be referred to the State Board of Health, a jury of six of the best physicians of the community, or the judge of the Circuit or Superior Court.

(5.) The Board should determine the number of officers necessary to the successful operation of the health service. Let these be selected by municipal authorities subject to confirmation by the Board of Health. All officers executing health laws to be required to report to the sanitary authority when directed. The inspectors to be under the sole charge of this department. Those officials solely employed in execution of health laws to be regulated as to term of office the same as members of Board of Health.

(6.) While the Board should have full power to compel prompt execution of sanitary ordinances and regulations, the execution of these should be done upon the most economical plan, compatible with successful operation of the department. To this end the demands of the health department should be executed when practicable through the municipal authorities, the Board of Health determining the time and manner of doing such work.

(7.) Every Board should enact and enforce a code of sanitary laws. These should cover as nearly as possible all general points of sanitary police, determine what acts and things are nuisances injurious to health, and provide a speedy mode to compel abatement of such nuisances. The duties of respective officers should be clearly defined. The health ordinances



should be pamphleted, and a copy furnished every official of a city, and the head of every family in city limits.

(8.) The intelligent and effective internal police of a city requires a trained corps of Sanitary Inspectors who should be kept constantly on duty in making systematic house to house inspections of the whole city. These officers should be men of intelligence and great reliability, and solely under the control of the Board of Health. This service should be fully systematized, and to this end the city should be divided into sanitary districts, and an inspector assigned to duty in one of these divisions, the number of inspectors to be such that each can traverse his district upon house to house inspections twice a month. I suggest to you the plan of this service as operated in Augusta, Georgia.

(9.) To the proper operation of an intelligent and economical health service, a Health Officer is absolutely indispensable. This official should be selected by the Board of Health, and, if deemed necessary, confirmed by the City Council. He should be a physician of undoubted qualification for the work, possessing, in addition to proper medical knowledge, a large amount of tact, firmness, and fearlessness, and having the full confidence and respect of the medical profession of his city. He should receive such salary as will enable him to devote at least one half of his time to the supervision of the affairs of the health government. His duties should be to supervise the sanitary police of the city; receive daily reports of sanitary inspectors, and reports of nuisances from citizens or officers, and have them speedily abated; see that the scavengers of the city are faithfully discharging their duties; keep an eye to the water supply of the city to preserve its purity, and see that abundant quantity is furnished for domestic purposes and for cleansing the drains and sewers; supervise with especial care the drains and sewers of the city; watch with jealous care to prevent that vilest species of rascality, the sale of adulterated or unsound food; be specially charged with direction of quarantine service, and hospitals for infectious and contagious diseases; promptly look to the enforcement of isolation of diseased persons, the disinfection of infected buildings or materials, clothing, bedding, furniture, etc.; receive reports of contagious and infectious diseases from physicians and citizens; withdraw from schools the children of families in which infectious and contagious diseases are prevailing; supervise vaccination service, seeing that all teachers and pupils in the public schools are vaccinated and revaccinated; have care of vital statistics; specially investigate causes of outbreaks of epidemic diseases, and render full and explicit history of each as it may occur.

(10.) Regular meetings — at least monthly — should be required of the Board of Health. At these meetings written reports from every department charged with execution of health laws should be required. In this manner, and no other, it can act intelligently upon the requirements of the health department.

(11.) Each Board should place itself in intimate relations with similar departments of other cities, coöperating with them in every measure looking to advancement of the public health, and should promptly furnish in-

formation of existence of infectious and contagious diseases and vital statistics. Similar relations should exist between the local Boards with the State and National Boards of Health.

(12.) A local Board should esteem it a special duty to intelligently endeavor to educate the community upon the principles, teachings, and value of individual and public hygiene. This in large measure may be done by issuing tracts from various sanitary authorities showing the basic principles of the science, their methods of individual and collective application; illustrating the necessity and value of such work by giving results from application of similar methods in other places.

(13.) The hearty support and encouragement of the medical profession is essential to the success of a local Board; therefore it is important that the Board should use every honorable endeavor to place itself upon the most cordial relations with this body of men. A Board ignoring this policy will never succeed in its endeavors to promote the public health. The requirements imposed upon physicians in reporting cases of infectious and contagious diseases, deaths, and births are somewhat inconvenient, and the sacrifices of these gentlemen should be appreciated and respected. The opinions of the prominent physicians of a community should have due weight in shaping the policy of the Board.

(14.) It is of vital necessity that the Board should establish cordial relations with the Mayor and Council of its city. A spirit of coöperation should animate the actions of these bodies. Jarring and warfare between them is wholly unnecessary, and should be jealously guarded against. Let each of these departments have its specific functions assigned by law, and adhere rigidly to its own duties, and be, as all should, a band of men working for the public good, each in his own department, ready to uphold and sustain the other. I am pleased to say that this spirit fully obtains between the Board of Health and the municipal government in the city from which I come.

Upon the first proposition it will be well to devote a few minutes to its proper elaboration. Here is the first step to successful administration of the health service. The existence of a Board of Health is an acknowledgment that sanitary science is a special study, and requires skilled supervision to its successful operation. Therefore, "Boards of Health for towns, cities, and States (possibly for the Nation also), should be established by proper authority and endowed with all necessary power for the performance of their duties. It is of but little account to establish these unless they are founded upon an intelligent recognition of their importance and necessity; but where sanitary information has been widely disseminated, and the people recognize its value by forming organizations for its further dissemination and study, Boards of Health will constitute agencies for which they will clamor, in order that these may superintend and carry out all that is required for the preservation of the public health. Their necessity arises from the fact that the power of determining and pronouncing nuisances must be lodged in some body recognized by law and invested with sufficient authority to enforce its conclusions. When epidemics burst upon a com-

munity there must be a department of the government, composed of experts sufficiently versed, to limit their sphere of disaster, and to protect the rest of the citizens. When legislation is to be executed in regard to health, it should be through the intelligent agency of those who have been trained in this branch of study."

"To health boards, selected on account of sanitary knowledge conjoined with executive ability, the public will learn to commit the sanitary interests of the country with confidence, and will be ready to lend every possible aid in the prompt execution of the plans they may propose and the orders they may issue."<sup>1</sup>

With these truthful and lucid propositions of the distinguished gentleman just quoted, how mortifying is the exhibit made in the tables just presented. Here you have the testimony of one hundred and four local Boards of Health as to their powers. Fifty-two of these say they have no authority whatever to enact health laws necessary to protect the health of their respective communities. Their sole power in this respect consists in recommending to the Council the enactment of health ordinances. To the shame of a vast majority of the city governments of this country be it said, they are jealous of committing this special subject — of such vital interest to their people — to the hands of men specially qualified and prepared to meet its issues. If they organize a Board of Health they gracefully tell its members, "You can suggest to us what measures you deem necessary to protect the health and lives of our citizens, and if we think your suggestions worthy of adoption we will enact them and have them enforced; if we do not approve of them it must be the last of it, for be it remembered we are the special depository of the knowledge of this place." Many of the Boards of Health in America — especially Southern ones — are held in the background by aldermen, to bear the responsibility when affairs relating to the public health go wrong. Deprived of all authority when danger is not imminent, they are kept in reserve until pestilence sweeps over the city; then the alderman hurriedly leaves the city for more inviting localities, and constitutes the Board of Health a provost guard to take care of the place until the alderman can return without risk to his august person. But too many of these Boards are formed by municipal authorities only for the purpose of complying with a law requiring their appointment. No matter what authority the Boards may have from a higher power than the City Council, they are expected to do nothing when they are selected, and their membership in many instances demonstrates their peculiar fitness for this great labor, and shows much judgment of human nature in the appointing power. Talk to the average ward politician of the day — the typical councilman of many cities — of the scope of powers and purposes of an efficient Board of Health, and his demeanor would bring a laugh to the face of a victim of incurable melancholia. Tell him the Board should have power to require of the Council efficient officers for this service, and he will loudly halloo, "No, we must have the sole voice in selecting your officers, — we are the Solons of this place,

<sup>1</sup> Extract from paper by Lewis H. Steiner, M. D., of Maryland, *Public Health Transactions*, vol. ii., p. 525.



selected because our constituents knew our wisdom ; we did not want the office, but took it to gratify them." Tell him how vital to the best interests of his city is a properly organized Board of Health, that it is a field requiring special study and peculiar fitness for efficient membership, and he will knowingly smile, and at least indirectly assure you that you are an ass. Tell him the Board should have plenary powers in health matters, and observe the dignified attitude he assumes. He stands up with an effort to put his head over the moon, and blandly tells you that he knows his business, he is opposed to the thing anyhow, but a few sentimentalists in the community have to be placated, and therefore he voted that it be allowed to exist in name, but bids beware that you do as little as possible. Talk to one of these responsables, and tell him that the Board should have the power to require such appropriations of money from the public treasury as it, in the exercise of a sound economy, may deem necessary ; saints and angels deliver us ; watch him swell into enormous proportions, fill with righteous indignation, put his hands in his pockets and nervously jingle a bunch of keys, strut backward and forward lost in bewilderment at the audacity of the suggestion. He raves like a madman, but finally cools his fevered brain sufficiently to utter a contemptuous sneer and ask, What ! permit a Board of Health to put its hands into the public treasury and take out what it thinks necessary to the successful working of its department ? Never, never. No, never !

But, seriously, a law giving less than plenary powers to a Board of Health is but empty pageantry or parade, mere show, and will inevitably bring such a body into unpleasant complications with the citizens, the Council, and the various departments of the city government. If it has not full power to enact and compel execution of health ordinances you may as well, for all practical purposes, have no Board, for when the harvest time comes and you examine the yield it will be found nothing but leaves. There may be a few exceptions to this proposition, but they are like angels' visits. A body of men organized with the avowed purpose of protecting the health of a city, — with all this weighty and fearful responsibility, — and yet having its sole power consist in being permitted to suggest matters to men wholly ignorant of even the elemental principles of this vast science, will not and ought not succeed. In cities having such Boards of Health I would respectfully suggest that the name be changed from Board of Health to the Board of Suggesters. It is quite time that sanitarians had aroused themselves to a proper appreciation of the dignity of their position. When the Solons of city governments ask upright, prudent, intelligent, exemplary citizens (and if the members of a Board of Health be not such they are in the wrong pew) to consent to occupy the exalted position of membership in a body of Suggesters, the kindly request to play the man-Friday to these men should be declined, and not many thanks accompany the declination. It is little enough to demand in return for their gratuitous labors for the public good that the members of the health service be treated as gentlemen of prudence and integrity, and receive and enjoy the confidence and respect of the community they so labor to advance and protect.

The law organizing the Board of Health should be obtained from the State Legislature, for the patent reason that if it be obtained from the City Council the Board will have great difficulty in maintaining its independence. Whenever the Board takes an advanced step to which a Council cannot attain, the latter then censures the Board, and if its admonitions are not heeded this creature of their power is hastily shorn of all authority.

The seventh proposition is an extremely important one. If you have no code of sanitary laws you can never have an efficient health service, for the officers of the Board, the members of the Board, or the citizens, will never know what is expected of its labors. As at present organized and operated a vast majority of these local sanitary authorities are wholly powerless to protect their respective communities, because of this very defect. They esteem themselves a body of epidemiologists, and seem to think that only epidemics are worthy of their care. Let an epidemic stare them in the face, — especially yellow fever, — then all is life and activity; every energy is put forth to avert so dreadful a calamity. A Board which has never met in years will hastily meet and in great alarm issue, or recommend the issuance, of hasty, ill-conceived, harsh, and oppressive regulations to meet the special danger threatening the community. Once the epidemic is over, or the danger averted, the Board, like an army, goes into winter quarters; or more properly, like an Arab silently folds its tent and noiselessly steals away, to be brought together again only when a similar danger calls them to the rescue. The regulations issued were intended for that particular occasion, and are not enforced after the campaign of the Board has ended. Take that most important of all the divisions of the labors of a local health service, the sanitary inspection of a city. Here is the answer from a vast number of cities, "We have no printed regulations governing our inspectors." In such places how can you expect good results from this field of sanitary police? The inspectors do not know what are nuisances injurious to health except such as appear to them individually to be such, hence in different districts of the same city nuisances vary with the capricious judgment of each inspector. Such administration only finds its counterpart in a city where no laws have been framed for the guidance of its citizens or officers, and where the police are sent out to arrest a fellow for doing whatever the policeman thinks wrong.

Upon the eighth proposition I desire to dwell with particular emphasis. No policy of Boards for saving thousands upon thousands of lives is comparable to this matter of systematic sanitary inspections. Its necessity is in consequence of the following condition of affairs: "There are houses, there are groups of houses, there are whole villages, there are considerable sections of towns, there are even entire and not small towns, where general slovenliness in everything which relates to the removal of refuse matter, slovenliness which in very many cases amounts to utter bestiality of neglect, is the local habit; where, within or just outside of each house, or in spaces common to many houses, lies for an indefinite time, undergoing fetid decomposition, more or less of the putrefiable refuse which house-life and some sorts of trade-life produce, — excrement of man and brute, and gar-

bage of all sorts, and ponded slop waters ; sometimes lying bare on the common surface ; sometimes unintentionally stored out of sight and recollection in drains or sewers which cannot carry them away ; sometimes held in receptacles specially provided to favor accumulation, as privy-pits and other cess-pools for excrement and other slop water, and so-called dust-bins receiving kitchen refuse and other filth. And with this state of things, be it on large or small scale, two chief sorts of danger to life arise : one, that volatile effluvia from the refuse pollute the surrounding air and everything which it contains ; the other, that the liquid parts of the refuse pass by soakage or leakage into the surrounding soil to mingle there, of course, with whatever water the soil yields, and in certain cases thus to occasion the deadliest pollution of wells and springs. To a really immense extent, to an extent indeed which persons unpracticed in sanitary inspection could scarcely find themselves able to imagine, dangers of these two sorts are prevailing throughout the length and breadth of this country, not only in their slighter degrees, but in degrees which are gross and scandalous, and very often, I repeat, truly bestial. And I state all this in unequivocal language, because I feel that, if the new sanitary organization of the country is to fulfill its purpose, the administrators, local and central, must begin by fully recognizing the real state of the case, and with consciousness that in many instances they will have to introduce for the first time, as into savage life, the rudiments of sanitary civilization.”<sup>1</sup>

“Every family in domicile is a perpetual source of unhealthfulness to itself and to the neighborhood by the constant outflow of excrementitious matters, and the accumulation of waste animal and vegetable products.

“From this source arise many of the chronic invaliding maladies which slowly waste the vital energies of the people of a community, and from the same source spring many of the most fatal and wide-spread endemics.

“It is demonstrable that the causes of sickness and mortality incident to the household may be so effectually controlled by adequate contrivances and intelligent supervision, that they are rendered entirely harmless.

“Experience proves that the family, whatever may be its social rank, does not secure adequate appliances, nor exercise that vigilant care, necessary to the entire control of the causes of sickness and mortality from this source.”<sup>2</sup>

Upon this state of affairs (so graphically depicted by Drs. Simon and Smith) the Government, that authority which has pledged itself to protect the life, liberty, and property of every citizen be he high or low, steps in and seeks to so regulate the home of each that it shall in no wise be unnecessarily productive of injury to its owner, or his neighbor, or fellow citizen. With all this stupendous source of disease production, how necessary the office of the Sanitary Inspector in the polity of a well-regulated and humane government. We are told that of one hundred deaths from preventable dis-

<sup>1</sup> *Filth Diseases and their Prevention*, by John Simon, M. D., F. R. C. S., chief medical officer of the Privy Council and of the Local Government Board of Great Britain, pages 33-35.

<sup>2</sup> Paper read by Dr. Stephen Smith, of New York, at meeting of American Public Health Association at Boston, 1876. See *Transactions Public Health Association*, vol. iii., page 53.



eases in this country, ninety are caused from diseases of man's production, either by filth in the domicile or carelessness of local surroundings, where ten are produced by those assuming epidemic proportions from contagion. Admit this, (and who can deny it?) do you not see that this service should have the hundred eyes of Argus with which to peer from day to day into the homes of the people and draw from their hiding-places into the bright light of day these unobserved causes of diseases and death to thousands upon thousands of our fellow citizens yearly? With such a system well organized and operated, the intelligent Sanitary Inspector becomes daily the minister of mercy, protecting man from his own ignorance, carelessness, or cupidity, and from such wrongs of his neighbor. Appreciate these facts, and cease to shut your eyes to your own filthiness, individual and collective, and when disease invades your city look to the homes of the people to see if the causes are to be found there instead of looking to causes solely from without; I know it is fashionable to try to trace every formidable disease to importation, and to ruthlessly violate every principle of humanity and manhood in covering up the sanitary defects of our dwellings or city. If the sanitary inspections of a city are to be of any service or benefit, they should be made regularly and systematically. Subject every lot in the whole city to these visits of the Inspector of Nuisances. Throw away the nonsensical, unjust, and unfounded presumption that the causes of disease evade entirely the domicile of the son of Croesus and stick entirely to that of the man Lazarus. Appreciate the truths stated by Drs. Simon and Smith, and you will have the basis of a well-regulated inspection service. A Board of Health operating an inspection service should so systematize this work that it shall constantly know the sanitary condition of every house and lot, public or private, every street, alley, sewer, and drain in the whole city. It should also have such system that it shall be able to ascertain daily if these officers are doing their duty faithfully. This is entirely feasible, and I offer you the following system, which I had the pleasure to inaugurate in the Board of Health of the city of Augusta, Ga., over which body I have the honor to preside. So far as I have been able to learn it is the only outline of the kind operated in the polity of health boards. It is as follows:—

1. Ascertain the whole number of blocks or squares in the city.
2. The number of lots in each square.
3. The total number of lots in the city.
4. Divide these lots into districts of such number that the inspector can traverse the whole district systematically from end to end twice a month. Upon this service this officer can inspect eighty lots daily—including the streets, alleys, drains, and sewers fronting the lots of each day's work.
5. Having ascertained the total number of lots to be assigned each inspector, mark out upon a city map the district of each officer. Upon this numerate the squares from one to fifty, sixty, or seventy, as number of squares necessary to form the total number of lots for each district may determine. In numbering the lots of every square it is proper to begin at one corner of the latter, say northeast, and work around the block, returning to initial point or lot. Number each lot of every square in the district 1, 2, 3, 4, etc.,

up to the total number of lots for each square. Furnish each inspector with a map of his district numbered as to squares and lots the same as the office-map of the Health Officer to whom these inspectors report daily.

6. Give each inspector daily two blank sheets having forty-five lines each — each line being for recording the condition of a lot. Upon these blanks the condition of every lot in the day's work upon the sanitary points desired is to be answered Yes or No, opposite each point in the blank. These blanks are filled daily, and the following morning handed to the Health Officer, or where the city is too large for the Health Officer to personally supervise this service, to a sanitary superintendent. Each day the inspectors receive two fresh sheets for the day's work, and return them properly filled the next morning. The form of blanks furnished inspectors is given on the next page.

An examination of this blank will show the number of each lot, the number of the square, the street fronting the lot, the name of the occupant, and name of owner or agent of lot, the abbreviations or marks used in answering questions, the sanitary points to be noted in relation to lots and streets. The inspectors report daily to the Health Officer, who notes carefully the sheets returned by each inspector. He knows from these reports where each day's work begins and ends. The inspector is to work only where assigned daily, of course following through the lots regularly from square to square until the whole district is finished. You can, from this system, know where the inspector of a district may be found at any hour of the day. Thus from this organization you have daily written reports of the condition of the streets, alleys, lots, drains and sewers from the inspector. In this way you also have reports as to the daily removal of garbage by the scavengers. If complaints of nuisances are rendered by citizens, then examine the report of the inspector; if his reports do not show its existence, then the Health Officer or a special inspector should investigate the matter. If it exists, and the written report of the inspector does not show it, it is proof positive of dereliction of duty. The sanitary code of the Board of Health should be furnished each of these inspecting officers, and he should be required to know its contents from end to end, and at his work should always have it with him. Each inspector is also furnished a pocket-book copy of the map of his district; also with a book of notice blanks similar to the one shown on page 109.

STREETS.	Sidewalk Needing Attention.	
	Alley Needing Attention.	
	Street Holding Stagnant Water.	
	Street Needing Raising.	
	Sewer Needing Cleaning Fronting Lot.	
	Condition of Sewer Fronting Lot.	
	Condition of Open Drain Fronting Lot.	
	Condition of Street Fronting Lot.	
WATER USED.	Water Works.	
	Well or Pump.	
WATER-CLOS- ETS.	Closets Needing Disinfecting.	
	Closets Emptying into Sewer.	
	Cess-pools Needing Disinfecting.	
	Cess-pools Needing Emptying.	
	Opening into Cess-pools.	
	Number of.	
PRIVIES.	Vaults Needing Disinfecting.	
	Vaults Needing Emptying.	
	Vaults, Number of.	
	Improperly Constructed.	
	Needing Disinfecting.	
	Needing Cleaning.	
	Open.	
Number of.		
CELLARS.	Improperly Constructed.	
	Used or Not.	
	Depth of Cellar.	
	Damp, Wet, or Holding Water.	
	Needing Whitewashing.	
	Needing Disinfecting.	
	Condition of.	
	Number of.	
LOTS	Lots Filthy or Unclean.	
	Cowsheds, Filthy or Unclean.	
	Cowsheds, Number of.	
	Stables, Filthy or Unclean.	
	Stables, Number of.	
	Ground under House lower than Level of Lot.	
	Not Connected with Street Drain or Sewer.	
	Stagnant Water on Lot.	
	Drainage Insufficient.	
	Level of Lot Improper.	
<div style="display: flex; justify-content: space-between;"> <div> <p>ABBREVIATIONS.</p> <p>G—Good.</p> <p>B—Bad.</p> <p>Yes—r.</p> <p>No—o.</p> <p>Date of Inspection —.</p> </div> <div> <p>Owner or Agent of Lot.</p> <p>Occupant of Lot.</p> <p>Street.</p> <p>Block No.</p> <p>Lot No.</p> </div> </div>		



No. \_\_\_\_\_  
 Mr. \_\_\_\_\_  
 No. \_\_\_\_\_  
 \_\_\_\_\_  
 Nuisance \_\_\_\_\_  
 \_\_\_\_\_  
 Time allowed, \_\_\_\_\_ days.  
 Notice to Abate,  
 Delivered \_\_\_\_\_ 188  
 \_\_\_\_\_

No. _____	AUGUSTA, GA. _____ 188
Mr. _____	
No. _____	
Your attention is called to a nuisance existing on your premises, No. _____ consisting of _____ _____	
which you are hereby notified to abate within _____ days. _____ _____	
Sanitary Inspector _____ District. By order of the Board of Health.	

If he finds a nuisance as specified in the sanitary code he immediately issues a notice for abatement. All notices for abatement of nuisances must be in writing, plainly specifying the nuisance found, the manner of, and time allowed for, compliance with notice. A copy of every notice issued is kept on the stub from which the original was torn. If the nuisance found was of sufficient consequence to demand immediate attention, it is the duty of the officer to return and ascertain if remedied within the time specified. If not of the former character, the next regular visit of the inspector will be time enough to ascertain the fact of compliance. When a notice-book is exhausted of blanks the stubs are returned to the office of the Health Officer and filed as records. When the inspections of the districts are finished, the reports of the sanitary inspectors are clamped together in book form — each district by itself — and filed in office. The sheets used daily are lightly fastened upon neat folding boards to facilitate writing on them.

At twelve o'clock of the day of the regular meeting of the Board of Health the inspector files with the secretary of the Board his monthly report, of which the following form is a copy, showing the totals of sanitary points obtained from each full inspection of his district, together with such remarks as he may deem necessary. See copy of this blank on next page.

AUGUSTA, GA. \_\_\_\_\_ 188

To L. T. BLOME, ESQ., *Secretary Board of Health.*

The undersigned, Sanitary Inspector for the \_\_\_\_\_ District, respectfully presents this  
his report for the month ending \_\_\_\_\_ 188

<p>Blocks or squares in my district . . .</p> <p>Lots in my district (total No.) . . .</p> <p>Lots, unclean . . . . .</p> <p>Lots, improper level . . . . .</p> <p>Lots, insufficient drainage . . . . .</p> <p>Lots, holding stagnant water . . . . .</p> <p>Lots, not connected with street drain or sewer . . . . .</p> <p>Lots, ground under house lower than level of lot . . . . .</p> <p>STABLES.</p> <p>Number of . . . . .</p> <p>Number in good condition . . . . .</p> <p>Number in bad condition . . . . .</p> <p>Cowsheds, in good condition . . . . .</p> <p>Cowsheds, in bad condition . . . . .</p> <p>CELLARS.</p> <p>Cellars, No. of . . . . .</p> <p>Cellars, wet or holding water . . . . .</p> <p>Cellars, needing disinfecting . . . . .</p> <p>Cellars, needing cleaning . . . . .</p> <p>PRIVIES.</p> <p>Privies, open . . . . .</p> <p>Privies, improperly constructed . . . . .</p> <p>Privies, needing disinfecting . . . . .</p> <p>Privies, needing cleaning . . . . .</p> <p>Water-closets, No. of . . . . .</p>	<p>Water-closets, entering cess-pools . . .</p> <p>Water-closets, entering sewers . . .</p> <p>Water-closets, entering open ditches . . .</p> <p>Water-closets, needing repair . . .</p> <p>STREETS.</p> <p>Streets, needing repair . . . . .</p> <p>Streets, ponds in . . . . .</p> <p>Streets, badly drained . . . . .</p> <p>Streets, needing raising . . . . .</p> <p>Streets, filth or garbage remaining in . . . . .</p> <p>Sewers, in bad condition . . . . .</p> <p>Sewers, traps or openings in bad condition . . . . .</p> <p>Open ditches in bad condition . . . . .</p> <p>Surface drains in bad condition . . . . .</p> <p>Alleys, No. of . . . . .</p> <p>Alleys, needing drain or repair . . . . .</p> <p>Alleys, filthy or garbage in . . . . .</p> <p>Sidewalks, needing repair . . . . .</p> <p>NUISANCES.</p> <p>Notices served to abate nuisances . . . . .</p> <p>Nuisances abated . . . . .</p> <p>Cases reported to Recorder . . . . .</p> <p>Number of persons fined . . . . .</p> <p>Number of persons found not guilty . . . . .</p> <p>Number of cases dismissed . . . . .</p>
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The lime distributors are \_\_\_\_\_ doing their duty faithfully.

The street scavengers are \_\_\_\_\_ doing their duty faithfully.

I have made \_\_\_\_\_ inspections of my district this month.

No. of days absent from duty \_\_\_\_\_. Cause \_\_\_\_\_

REMARKS.

Signed \_\_\_\_\_

Sanitary Inspector \_\_\_\_\_ District.

Finally the quarantine service of a municipal Board of Health is of great value, in fact indispensable. Quarantine coming down to us hoary with years, its mantle dripping with the blood of thousands upon thousands of helpless victims, covered all over with failure and barrenness, it yet remains the sheet-anchor of hygienic warfare against the invasion of contagious and some infectious diseases, and as such must hold high place in the policy of all sanitarians. While in the past every element of humanity and propriety has been violated in operating this service, the intelligent observer must admit that this was the abuse, not the use, of the measure. Want of study of the natural history of diseases, their essences and modes of propagation, with absence of organization of intelligent measures, were the prominent elements of its inhumanity and failure. With all the maledictions which have been showered upon it, the good of the whole country demands that it shall be adhered to, properly organized and operated, but at the same time every unnecessary burden to the individual, to the community, and to commerce should be eliminated therefrom. By quarantine I mean that intelligent supervision of all channels of entrance of these diseases into a community, the enforcement of rigid inspections, disinfection of infected materials, the isolation of the sick from the well, with the detention in a separate hospital or house of persons reasonably suspected of being already contaminated with the poison. The elements of quarantine are divided into external and internal. In relation to the former, I have only to say that the Board should be vigilant in the exercise of proper measures to prevent the introduction of contagious and infectious diseases within the community. I ask your attention to the subject of internal quarantine. It is mortifying to investigate the systems in operation in the cities of America looking to the control of cases of infectious and contagious diseases. See the unbridled license permitted citizens in scattering the seeds of these diseases broadcast over the community. Small-pox, measles, scarlet fever, diphtheria, whooping-cough, cholera, etc., prevail in our cities to an alarming extent without an intelligent effort being put forth to suppress the early cases. The ignorance of the average citizen in relation to the preventability or control of these deadly diseases is truly pitiable. He regards nearly all of them as necessary to childhood, and when a child takes either of them the rest of the children are permitted to remain with the one infected, under the idea that these diseases are unavoidable in a life time, and that the child stands them better in its tender years than in adult life. It is not uncommon to hear an intelligent parent exclaim, "I wish they would all take it and get through with it at the same time." If the children are separated from the sick one, the mother insists upon nursing the invalid, and yet without changing the clothing worn in the sick room, insists upon going frequently into the presence of the well ones, thus rendering nugatory all efforts at isolation. The ignorance or carelessness of Boards of Health upon this subject is scarcely less melancholy, for with the exception of small-pox no special effort is made by a vast majority of them to secure reports of early cases, followed by isolation, disinfection, etc. Children in daily contact with the



infected are permitted to continue attendance at schools, and thus scatter these destructive diseases all over the city among helpless and innocent children whom it is their solemn duty to protect. The helplessness of Boards in control of small-pox seems in many cities as fully marked as in any of the other maladies enumerated. Some of the most frightful epidemics within the decade have been of this fearfully dangerous, disgusting, and disfiguring disease. At the present hour small-pox is rioting over six or seven cities in this country. This is shameful and inexcusable negligence, and should subject the authorities of these places to at least severe censure. If there is any truth demonstrated on earth it is that small-pox is absolutely under the control of an intelligent and active health service. I state boldly what no intelligent physician or student of public hygiene can deny, that you can introduce small-pox simultaneously into every city in this country, and if the municipal authorities have done their duty in requiring vaccination and revaccination of the whole people in times when no small-pox existed, and prompt reports of first cases be required, coupled with immediate measures of isolation and disinfection, you will fail to develop an epidemic of small-pox in any single one of these cities, no matter how populous it may be. The history of measles is more lamentably demonstrative of individual and municipal carelessness than small-pox. Measles is actually regarded as so harmless that the rigorous measures necessary to its control are considered as more onerous than the disease we would prevent. Is this proposition true? No. Measles is not a harmless or insignificant disease. The mortuary records yearly demonstrate that it is an extremely fatal one, and produces ten times more deaths in a decade than some of the maladies which arouse the fear and evoke the protection of the health boards of the whole country, or secure the aid of the State or national authority. Let yellow fever, for instance, appear in a city and produce a hundred deaths, and the whole country is aroused at the enormous waste of human life. Money by thousands upon thousands of dollars is forwarded to the sorely afflicted people, experts are sent to attempt to control its ravages, the citizens flee as from the city of destruction, and the press of the whole country daily teems with news from the stricken city. Observe the difference in the cities where yellow fever and measles are prevailing. In the latter, no public alarm exists, no terror seizes the inhabitants and causes them to flee the city with their helpless young. Citizens of intelligence actually observe undismayed the hundreds of helpless children thrown upon beds of sickness and taken to the grave by this disease, far more fatal than yellow fever by reason of its more widespread diffusion. The same carelessness or indifference to scarlet fever, whooping-cough, and diphtheria obtains. The census of 1870 shows that there were 4,507 deaths from small-pox; 9,237 deaths from measles; 20,320 deaths from scarlet fever; 22,187 deaths from enteric fever; 177 deaths from yellow fever; 7,142 deaths from intermittent fever; 4,281 deaths from remittent fever; 6,303 deaths from diphtheria; 9,008 deaths from whooping-cough; 256 deaths from cholera.

From this exhibit, which is probably an average of a decade, it will be seen that measles caused more deaths than either of the above named dis-

eases except scarlet and typhoid fever. If to the number registered as measles could be added those deaths from pneumonia, diarrhœa, and others, sequences of measles, it would show a mortality equally fatal with any of the above. When we appreciate these facts, how melancholy is the comment upon man's carelessness and inhumanity in failing to protect helpless children and adults.

Organize your internal quarantine service upon sound principles, and then the control of contagious and some infectious diseases is assured. What are the requirements of this measure?

1. Require immediate report of first cases from physicians, and where none is in attendance, from the head of the family, to the Board of Health.
2. Isolation of infected persons under the supervision of reliable officers of the Board.
3. Disinfection of infected buildings and materials, such as clothing, bedding, furniture etc., and in case of the latter, its destruction where disinfection is impossible. To this end the Board should have an intelligent officer to supervise this department.
4. Withdrawal of teachers and children from schools, where they come from families in which infectious or contagious diseases are prevailing.
5. Systematic vaccination and revaccination of the entire community, and exclusion from schools of all children and teachers failing to present satisfactory evidence of successful vaccination.
6. A hospital properly located, to which persons sick of contagious diseases may be taken and treated, where isolation cannot be secured in private houses.
7. A quarantine hospital for the detention of persons reasonably suspected of infection, though not sick as yet of the disease. To this hospital only such cases are to be taken as cannot be properly managed in private houses.

In this lengthy and, I fear, tedious and disjointed paper, I have attempted to cause you to fully realize the necessary scope of the powers and duties of municipal health boards: to look with especial care to the sanitary condition of the homes of the people with a view to the prompt removal of filth and other accumulations so harmful in disease production, and at the same time organize and operate that service, the complement of the one just named, that is, external and internal quarantine measures as above given. These two systems must go hand in hand in the enlightened administration of the health service of the country.

## IX.

### DISEASE AMONG TEXAS CATTLE.

*A Continuation of the Report made to the Association at the New Orleans Meeting, December, 1880.*

BY DR. JOSEPH R. SMITH,

*Surgeon U. S. Army.*

SINCE my report made to this Association in December, 1880, additional reports, both in regard to disease in Texas cattle and the pathological conditions in beeves killed for food, have been received, and the Table on pp. 116, 117 embodies the description of the pathological appearances. This table is in the same form and is to be considered in connection with and as part of the table published in pages 241 and 242 of the sixth volume of the "Transactions of the American Public Health Association."

The questions asked are on the following subjects:—

1. As to age of animal killed.
2. Oldest animal known.
3. Bloody serum in pericardium.
4. Ecchymosis on heart.
5. Weight of liver.
6. Fatty degeneration of liver.
7. Reddening of gall-bladder.
8. Size of spleen.
9. Color and consistence of spleen.
10. Appearances of renal pelves.
11. Appearances of lining membranes of bladder.
12. Appearance and consistence of abomasus.
13. Temperature.
14. Other pathological appearances.
15. Epidemic diseases.
16. Imported cattle and their health and diseases.
17. Mortality.
18. General information on the former or cognate subjects.

The facts and conclusions are based on tables, on numerous letters received, and on personal interviews between myself and twenty-seven different stock raisers and drovers. Post mortem examinations of several hundred (two hundred and fifty reported quite in detail) animals were made by fifteen observers, and in fourteen localities in northern, southern, and western Texas. Of these, all except thirteen are reported as healthy at all seasons of the year. This number is not very great, but it is believed



to be sufficient to give very definite results, while on the other hand this very limitation in number enabled the observer to make thorough, deliberate, and careful examinations.

AGE. — The following is the proportion of animals killed at different ages as reported: —

One to two years old . . . . .	.59 per cent.
Two to three years old . . . . .	23.22 per cent.
Three to four years old . . . . .	20.24 per cent.
Four to five years old . . . . .	23.81 per cent.
Five to six years old . . . . .	5.36 per cent.
Six to seven years old . . . . .	9.52 per cent.
Seven to eight years old . . . . .	2.98 per cent.
Eight to nine years old . . . . .	6.55 per cent.
Nine to ten years old . . . . .	1.19 per cent.
Ten to eleven years old . . . . .	2.98 per cent.
Eleven to twelve years old . . . . .	.59 per cent.
Twelve to thirteen years old . . . . .	.59 per cent.
Thirteen to fourteen years old . . . . .	2.38 per cent.

Since the above percentages were calculated, three cases have been reported as killed at four, and two at five, years old. The addition of these would make a scarcely appreciable increase in the per cent. of animals killed at these years.

Between the ages of two and five, two thirds of all the animals were killed, and more than four fifths between the ages of two and seven.

The cases of diseased liver reported were found in cattle aged as follows: one aged six, one aged nine, two aged eight, and two aged thirteen. The other cases occurred in cattle whose age is not reported.

Cattle are reported to have attained a maximum age of twenty-five, and all above twenty, the cause of whose death is known, died of old age, many of them reported as toothless. Very few cattle could be found to have reached the age of fifteen, being generally killed for beef before attaining that age. One cow is reported by Surgeon Waters as giving milk at nineteen years of age.

Mr. Gooch, of Mason, writes: "This question could not be answered by many of us who raise cattle, as we keep no account of their age, more than we know that they live to be quite old when compared with the age of cattle in the Northern climate. I would say that twenty years old is not an uncommon age. Mr. G. Brandenburger, of this county, told me about three years ago, that out of twenty or twenty-five cows (I do not remember the exact number) he had purchased twenty-one years previous, he then had two of the original stock left, and that the cattle were from four to five years old when he purchased them, which would make the two living at that time not less than twenty-five years old, and one remarkable feature in the premises is the fact that these old cows continued to breed."

*Appearances of Heart.* — Every observer, save three, reports that no bloody serum was found in the pericardium, and no ecchymosis appeared on either outer or inner surface of the heart; one adding, "all hearts normal;" another, "all found perfectly healthy;" another, "the outer and inner surfaces of the heart were uniformly healthy and normal in every animal."

Table of Pathological Appearances in Texas Cattle.

1st Question.	2d Question.	3d Question.	4th Question.	5th Question.	6th Question.	7th Question.	8th Question.	9th Question.
Asst. Surg. P. Middleton, U. S. A., San Antonio, Texas.	3 to 7.	No.	No.	8½ lbs. Max. 13½. Min. 5½.	2 livers from cows over 13 years of age were filled with small abscesses containing bloody pus and serum, the rest healthy.	No, except in the cases mentioned under No. 6.	21 in. by 4½. Weight 3 lbs.	Dark purple. Consistence of jelly.
Dr. A. L. Buffington, Fort Ringgold, on the Rio Grande.	7 years. Old age.	In 3 cases only out of 20.	No.	Av. 8½ lbs. Max. 13½. Min. 5½.	Fatty degeneration in 2 cases in 20.	Yes, in 6 cases out of 20.	20½ by 5-45. Max. length, 23. Max. breadth, 7. Min. length, 17. Min. breadth, 4½. Weight, av. 2 lbs.; 1 lb. 2 oz. 3 oz.	Purple all. All pulpy.
Asst. Surg. J. L. Powell, U. S. A., Fort Griffin, on the Brazos, N. E. Texas.	3 to 4.	No.	No.	Largest 14 lbs. Smallest 8½.	No.	No.	Max. 22 × 5 in.; 3 lbs. Min. 13 × 3 in.; ½ lb.	Dappled, blue, or slate. Firm.
Surg. W. E. Brown, U. S. A., Fort Davis, Texas.	2 to 5. Average 3½.	No.	No.	Av. 16½ lbs. Max. 23. Min. 8½.	No.	No.	Max. 22 length, 3½ breadth, 4 lbs. Min. 13 length, 5½ breadth, 1 lb. Aver. 17½ length, 4½ breadth, 2½ lbs.	Grayish blue, with slate-colored spots on external surface. Dark red substance, firm and solid.
W. F. Carter, Asst. Surg., U. S. A., Fort Concho, Texas, on river of same name.	-	-	-	-	-	-	-	-
Asst. Surg. E. Woodruff, U. S. A., Fort Stockton, Texas.	2 to 8. Average 4-7.	No.	No.	Av. 9½ lbs. Max. 11 lbs. Min. 8 lbs.	No.	No.	Aver. 14 × 4 in.; 2½ lbs. Max. weight, 2½ lbs. Min. weight, ½.	Pearly gray. Firm.
Asst. Surg. B. D. Taylor, U. S. A., Fort Ringgold.	Average 4½. Max. 11. Min. 2.	Yes, in 9 of 46 not reported.	Not reported.	Av. 7½ lbs. Max. 11 lbs. Min. 4½ lbs.	Yes, in 1 case. 4 nutmegs.	In 3 cases light red.	Av. length, 19, br., 5 in. Max. length, 25, br., 12 in. Min. length, 16, br., 3½ in. Av. weight, 2.3 lbs. Max. weight, 5½ lbs. Min. weight, 1½ lbs.	Bluish gray or slate. 6 light red. 1 streaked.
Surg. J. C. G. Happer- sett, U. S. A., Fort Brown, Mouth of Rio Grande.	4 to 5.	No.	No.	Av. 8½ lbs. Max. 9 lbs. Min. 7½ lbs.	No.	No.	Av. length, 18.4, br., 4.4 in. Max. length, 20, br., 4.3 in. Min. length, 18, br., 4 in. Av. weight, 2.4 lbs. Max. weight, 3 lbs. Min. weight, 1.9 lbs.	Gray or lead color.
Asst. Surg. J. B. Girard, U. S. A., Fort Davis.	Av. 3 yrs. Max. 4. Min. 2½.	Not known.	No.	Av. 9 lbs. Max. 10½ lbs. Min. 8 lbs.	No.	In one case a few patches of infection.	Av. 19 × 5. Max. 22 × 5½. Min. 18 × 4½.	Light grayish purple, speckled with white, doughy rather than firm.
Asst. Surg. V. Havard, U. S. A., Presidio.	3	20 to 25.	No.	Not reported.	No.	No.	23 × 5½ × ½.	Dark red. Rather soft and brittle.

10th Question.	11th Question.	12th Question.	13th Question.	14th Question.	15th Question.	16th Question.	17th Question.	18th Question.
Asst. Surg. P. Middleton, U. S. A., San Antonio, Texas.	No. But of dull white.	Healthy. No traces of hemorrhage.	103 $\frac{1}{2}$ °. 103 $\frac{1}{4}$ °. 104°.	No answer.	No.	Yes. Suffer more or less until acclimated.	No answer.	No answer.
Dr. A. L. Buffington, Fort Ringgold, on the Rio Grande.	3 dark. 2 dark red. 2 streaked. 3 not stated.	1 red. 1 red, slightly. 1 hemorrhage. 17 not stated.	5 flaccid. 9 petechiæ. 1 slightly congested. 5 no report.	No answer.	Hollow horns from April to December.	None.	10 per cent. want of water and screw worm.	Beef miserable $\frac{1}{2}$ the year; fair other $\frac{1}{2}$ .
Asst. Surg. J. L. Powell, U. S. A., Fort Griffin, on the Brazos, N. E. Texas.	Dark red. Not stated.	Peach, amber. No hemorrhage.	Not stated.	None.	None.	Yes. $\frac{1}{2}$ die in 1 year of murrain. No precautions.	3 per cent. old age.	Vide body of report.
Surg. W. E. Brown, U. S. A., Fort Davis, Texas.	Yellow and fatty. Not streaked.	Yellowish. No hemorrhage.	Not determined.	None.	Vide body of report.	None.	Not determined.	Nothing additional.
W. F. Carter, Asst. Surg. U. S. A., Fort Concho, Texas, on river of same name.	-	-	-	-	-	-	-	Rarely present any disease save of liver.
Asst. Surg. E. Woodruff, U. S. A., Fort Stockton, Texas.	Rather dark. Not streaked.	White. No hemorrhage.	Not determined.	None.	Vide body of report.	None.	No answer.	In much better order than last year.
Asst. Surg. B. D. Taylor, U. S. A., Fort Kinggold.	25 dark colored. 29 no report.	Pale yellowish.	Av. 102 $\frac{1}{2}$ °. Max. 103 4-5. Min. 100 3-5.	-	-	-	-	No answer.
Surg. J. C. G. Happersett, U. S. A., Fort Brown, Mouth of Rio Grande.	No. Brown or chocolate.	Pale straw or yellow. No hemorrhage.	Av. 102 $\frac{1}{2}$ °. Max. 103 $\frac{1}{2}$ °. Min. 101 $\frac{1}{2}$ °.	No.	None.	In two cases. Died the first summer. No special precautions.	No information.	Vide body of report.
Asst. Surg. J. B. Girard, U. S. A., Fort Davis.	Light. Not streaked.	Grayish white. No hemorrhage.	No observations.	None.	Vide body of report.	No.	Not determined.	Vide body of report.
Asst. Surg. V. Havard, U. S. A., Presidio.	Red and smooth.	Pearl white. No hemorrhage.	No observations.	None.	None. Vide body of report.	None.	10 per cent. exposure and casualties. Mainly among calves.	Good.



Of the exceptional "three" referred to, one makes no report on the subject; one says, "not known;" and the third reports, in twelve cases out of fifty, that the pericardia contained bloody serum.

In response to further inquiry on the subject in a letter from me asking this officer (Dr. Buffington, at Fort Ringgold) for further details of the pathological appearances reported by him, he replies to me: "Eleven of the twelve cases of bloody serum in the pericardium are erroneously reported, but one occurred. I cannot imagine how a mistake was made in reporting so many cases of bloody serum in the pericardium, as I remember my answers to the different queries."

"My memory is very vivid on the subject, which causes no doubt in my mind as to the correctness of my (this) statement."

*Liver and Gall Bladder.*—One observer, Dr. Buffington, reports four cases of fatty degeneration in fifty autopsies. This same officer reported the sole cases of bloody serum in the pericardium, and in two of the same animals these morbid appearances co-existed. The same observer reports that in eight specimens the gall bladder showed reddening, and in three specimens was "light red." Two of these cases of reddening of the gall bladder occurred in the cases of fatty degeneration reported.

In two cases the gall bladder is reported as distended, one of the distended gall bladders being accompanied with no other morbid appearance, and the other occurring with a liver weighing thirteen and one fourth pounds, and in a state of fatty degeneration.

Three of the cases of fatty degeneration were of the largest livers found at Ringgold, and weighing respectively thirteen and one fourth pounds, twelve and a half pounds, and eleven and a half pounds. In the fourth case the liver weighed but seven and three fourths pounds. Of these four livers, that weighing seven and three fourths pounds was from a cow aged six years, weighing three hundred pounds, having a calf aged seven months, and giving a temperature of 102.6° F. The liver weighing eleven and a half pounds was from a steer nine years old, weighing six hundred and fifty pounds, and whose temperature is given as 102.2° F. The liver weighing twelve and a half pounds was from a steer eight years old, weighing four hundred and sixty pounds, temperature not given. The liver weighing thirteen and one fourth pounds was from a steer eight years old, weighing five hundred pounds, temperature not given.

Further report from Dr. Buffington says, under date of October 19, 1881, "Full assurance as to the existence of fatty degeneration of the liver was not had, as the microscope was not used, none being available; but I am satisfied in myself that it did exist from the color it presented, and general appearance, and also reasoning by exclusion."

Four cases of nutmeg liver are reported by Dr. Taylor, who also observed at Fort Ringgold, but subsequently to Dr. Buffington. They all occurred in steers two years old, weighing respectively 500, 600, 730, and 500 pounds, and whose livers, in the same order, weighed 8½, 7½, 7½, and 6½ pounds, the temperature of the first and third in the list being respectively 103.8° F., and 102.2° F., the temperature of the others undetermined.

In these four cases it is further expressly stated, "other organs healthy."

Five other cases of diseased liver are reported as follows. Dr. Gorgas says: "The livers in all cases were markedly yellow, and somewhat softer than they should be. The color had the appearance of bile-staining, though there was no catarrh of gall duct or small intestine. The natives attribute it to the animals eating cactus. Only one liver could I call diseased (weighed ten pounds). This was firmer than usual, and at several points the proper substance of the organ was replaced by a firm white tissue resembling cicatrized tissue. All other organs normal, and the animal, before death, apparently in good health."

No liver reported by this observer of greater weight than ten pounds.

Dr. Middleton, from San Antonio, says: "Nineteen of the livers examined were healthy, and two from cows over thirteen years of age were diseased; these livers were filled with small abscesses containing pus and bloody serum. None of the gall bladders showed signs of reddening, except the two above mentioned."

Dr. Davis, from Corpus Christi, writes: "In two of the specimens multiple abscesses of small size, conjoined with considerable congestion, were found. Small calcareous deposits were observed in one of these specimens."

"No evidence of abnormal reddening was seen upon examination of the gall bladders, the inner surface being of a faint pinkish color; when recently taken from the animal, changing to a greenish cast from post mortem absorption."

No other abnormal appearance of liver or gall bladder is recorded by any of the observers.

The average weight of the liver appears to be between seven and eight pounds, or 7.54 pounds, fifteen pounds being the maximum, and four and a half the minimum.

The average weight of animals reported killed at different ages, and the average weight of their livers, was as follows:—

Average Weight of Animal.	Average Weight of Liver.	Age.
475.45	7.14	2 years.
441.66	6.82	3 years.
385.42	6.92	4 years.
258.33	8.66	5 years.
355.71	7.95	6 years.
275.00	7.33	7 years.
465.71	9.25	8 years.
550.11	11.00	9 years.
398.75	8.75	10 years.
450.00	9.00	11 years.
400.00	7.87	13 years.

As far as these figures go they would not seem to show that the weight of the liver varied proportionately, either with the weight of the animal or its age; still the variation was rather with the age than with the size; for while the average weight of animals seven years old and upwards exceeded

the weight of those six years and under but about one sixtieth, the weight of the livers of these same older exceeded the weight of the same younger about one seventh.

Larger observations would probably change these proportions.

*Spleen: Size, Color, and Consistence.*—Generally but two dimensions of this viscus have been given, viz., length and breadth; the thickness being given by two observers only, and as “one and a half inches in thickness,” and “a little over one inch thick in its thickest” part.

Of course, but two dimensions give but an indefinite idea of size. The greatest length of spleen reported was twenty-five inches, while the maximum weight observed was five and three fourths pounds.

These maxima all occurred in different spleens.

The spleen weighing five and three fourths pounds measured twenty-one by five inches.

The spleen twenty-five inches long weighed three and a half pounds; and the one twelve inches in width weighed five and a half pounds.

The spleen weighing five and three fourths pounds was “dark-colored,” was found in a cow, four years old, weighing three hundred and forty pounds, and having a calf three months old. It was reported by Dr. Buffington at Ringgold, who also found in the same case bloody serum in the pericardium, a liver weighing six and three fourths pounds, the lining membrane of the fourth stomach “spotted,” the bladder “light red,” and the temperature, 102.6° F.

Three spleens only are reported that weighed as much as five pounds, three between four and five pounds, and four between three and four pounds. Of these ten spleens, all but one were found at Fort Ringgold, and but three occurred in connection with other morbid appearances. One of those has been mentioned above. In the second case, where the spleen weighed five and one eighth pounds, the animal was a steer five years old, weighing two hundred and fifty pounds. Its liver weighed seven pounds, and was healthy, while the lining membrane of its fourth stomach is described as “spotted.” In the third case, heretofore mentioned, a steer weighing five hundred pounds, and aged eight years, the liver weighed thirteen and one fourth pounds, and showed signs of fatty degeneration, the gall bladder was reddened and much disturbed, the spleen was “pulpy,” the pelvis of the kidneys “streaked,” the lining membrane of the bladder showed hemorrhage, and the lining membrane of the fourth stomach petechiæ.

The minimum length reported is eight inches, the minimum breadth two and a half inches, and the minimum weight one pound.

The average weight of the spleens reported was almost exactly two pounds (1.98).

Of its consistence, one observer says that it is inclined to flabbiness, more than human spleen; one says soft, brittle, easily broken down, and very vascular; one says normal; one says consistence of jelly; one pulpy; one says doughy rather than firm; one rather soft and brittle; while four characterize it as firm, one of the four adding solid.

In regard to color: the interior part is uniformly spoken of as dark red.



The terms dark red are used also without indicating to what part it refers, while the exterior surface is described as mottled blue or grayish, normal, dark purple, purple, "dappled blue or slate," grayish blue with slate-colored spots, pearl gray, gray or lead color, light grayish purple streaked with spots of fat.

It would seem in reference to consistency and color, that different observers, according to their particular idiosyncrasy, described the same condition by different terms.

Dr. Havard adds to his description, "the nodules and corpuscles clearly seen through the capsule."

Dr. Powell, who calls the color "dappled blue or slate," and the consistency "firm," adds, "they were all quite uniform in these respects. The size of the viscus seemed to vary with the age of the animals up to five years."

According to my figures, the weight increased regularly from two to five years of age, after which no rule in reference to age could be discovered.

*Pelves of the Kidney.* — To the questions whether the pelves of the kidney showed a bright red color, a dark color, or were streaked with blood, answers also differed.

The color is described as follows: "Light red," "white, with blush of pink" "dark color," "bright red" (by two), "dull white," "dark red," "yellow and fatty," "brown or chocolate," "rather dark," "light," "normal," and "red and smooth."

Most of the reports state there were no streaks. One observer only, Dr Buffington, reports in two cases "streaked." One of these cases is the one previously described, of fatty liver weighing thirteen and one fourth pounds. The other was from a cow weighing three hundred and fifty pounds, and having a calf of two and a half months. This cow was aged six, furnished a liver weighing seven and one half pounds, and a reddened and distended gall bladder. A dark purple spleen, weighing two and three fourths pounds. Slightly reddened lining membrane of the bladder, and petechiæ in lining membrane of fourth stomach.

*Lining Membrane of Bladder.* — The color of this membrane is described with considerable uniformity, as "yellowish," "white," or "amber or cream color," or "faint pink," or by Dr. Buffington as "light red" and "reddened." This same observer reports one case as presenting traces of hemorrhage. This was the before-named steer, with a thirteen and one fourth pound fatty liver. No more minute description of these cases is given.

*Fourth Stomach: Lining Membrane.* — The inner surface of the abomasus is described in color as "greenish drab," as "dull red," as "pinkish white," as "bluish," as "dark, muddy yellow," as "pale pink," as "ashy gray," as "pale rose or pinkish," as "white," as "stained by contents."

The majority report this membrane as not flaccid, as not stained, and as not spotted. While several add the expression that they were healthy.

Dr. Davis, at Corpus Christi, states that in two instances they showed "stains and petechiæ spots," but gives no other details on the subject.

Dr. Buffington describes nine specimens as presenting "petechiæ" and sixteen as "spotted," and nine as flaccid.

None of those described as flaccid were spotted, nor do any of the other post-mortem appearances described in these cases point to any pathological significance in either flaccidity or spots.

*Temperature.* — Six observers only succeeded in obtaining temperature. Dr. Harmer, at San Felipe, reports the temperature in one case as 98°. As he gives no details, and as the result varies so much from that obtained from other observations, I am inclined to think the bulb of the thermometer was not exposed a sufficient length of time to the bodily heat, and I regard this observation as valueless.

Below is given the temperature in each case, as noted by the other observers.

	Dr. Happersett.	Dr. Middleton.	Dr. Davis.	Dr. Taylor.	Dr. Buffington.
- -		103.5°	103.2°	102.6°	102°
- -		103.8	105	102	102.8
- -		104	105.2	101.6	102.2
- -	- -	- -	101.4	102	102
- -	- -	- -	104.6	102.2	102.4
- -	- -	- -	- -	100.6	102
- -	- -	- -	- -	102.6	102.2
- -	- -	- -	- -	101.4	102.2
- -	- -	- -	- -	102.4	102.2
- -	- -	- -	- -	103.8	102.6
- -	- -	- -	- -	202	102.6
- -	- -	- -	- -	102.2	102.4
102°	- -	- -	- -	102.2	102.6
102.4	- -	- -	- -	- -	102.4
103.5	- -	- -	- -	- -	102.4
101.5	- -	- -	- -	- -	102.6
102	- -	- -	- -	- -	102.4
102.4	- -	- -	- -	- -	102.6
Average. . . .	102.3	103.75	103.88	102.31	102.38
Maximum . . .	103.5	104	105.2	103.80	102.8
Minimum . . .	101.5	103.5	101.4	100.6	102

Dr. Taylor says: "It will be noticed that, in many cases where the animal was otherwise perfectly healthy, the temperature was high, whether normal or not I cannot say. The temperature was taken by inserting the bulb of the thermometer directly into the blood flowing from the large arteries at the root of the neck." Dr. Taylor's temperature observations are from thirteen animals.

Dr. Buffington reports the temperature of eighteen animals.

Dr. Davis's remarks on this subject are published in my former report. He made five observations, which were doubtless reliable. Possibly the

minimum, taken in a struggling animal, may have been insufficiently exposed.

Dr. Middleton made three observations, and remarks as follows: "It is impossible to get the rectal temperatures of the cattle that are killed in this vicinity without a great sacrifice of thermometers. The above temperatures were taken by plunging the thermometer into the wound at the neck, while they were bleeding to death."

*Other Pathological Appearances.* — In my former report is mentioned a case of partial atrophy of the right lung reported by Dr. Davis, erroneously credited to Dr. Harmer, and the remarks of Dr. Gorgas are repeated in this paper in connection with the weight, etc., of the liver.

No pathological appearances, save those above described, have been reported as seen by any of these observers.

The butcher at Fort Davis in July, 1881, stated that, in a herd from which some time previously he had killed beeves for Fort Davis, "he had almost constantly noticed the presence of calculi," about the size of a pea, in the kidney.

*Prevailing Diseases; Importation of Cattle; Mortality among Cattle, and Cause, etc.* — So far as appeared in my previous report, no disease was epidemic or prevailing among the cattle therein treated of.

Near Fort Duncan the mortality among cattle was reported about one per cent., and near McKavett as less than two per cent., from disease, — the cause of death being generally accidents and exposure.

At McKavett and Corpus Christi, cattle had been imported from the North, of whom large numbers had died, — *vide* letter of Mr. Gooch in my former report.

Dr. Buffington now reports from Ringgold that "the annual mortality is about ten per cent.; want of water and screw worms getting into branding wounds are the principal causes of death. Hollow horn usually exists for four months during the year, — from December to April."

Dr. Middleton, at San Antonio, says: "I know of no disease or epidemic prevailing among the cattle in this vicinity. A number of Northern cattle have been imported to this vicinity; so far as I can learn they suffer more or less until they become acclimated. Many die; others recover and do well."

Dr. Happersett, from Fort Brown, writes: "Epidemic diseases are said to be unknown. I can at least find no evidence of pleuro-pneumonia in the cattle of this section.

"If we can place any dependence upon the evidence given by the stock-raisers, but few cattle die from any cause in this section; those that do, from inanition (starvation).

"I can find no evidence of any epidemic disease ever having appeared in this section, and cattle only die of what may be considered natural causes, in which I would include starvation.

"I can learn of but two stock-raisers in this vicinity who have made any effort to improve the grade of native cattle by *direct* importation from the North (outside this State). These gentlemen inform me that in every in-



stance the animals died the first summer. No special efforts were made to protect them from the extremes of climate."

Dr. Powell reports that at Fort Griffin he heard of no disease or epidemic prevailing among cattle.

He further says: "A large number of short-horn Durham bulls are imported from the Eastern and Northeastern States. No special precautions are taken to preserve their health, but they are allowed to live under the same surroundings as native Texas cattle. Almost one half of them die in twelve months with what the stock men term a *bloody* murrain and a *dry* murrain, the former characterized by a discharge of bloody urine, the latter by impaction of hard, dry, immovable fæces, in a hot, dry rectum. Both conditions are attended by high fever. On post mortem the bladder is found filled with blood, or the lower bowel hot and dry, and loaded as indicated. The two conditions do not appear to co-exist.

"In regard to the terms bloody murrain, dry murrain, and Texas fever, which have been referred to, it is proper to state that there seems to be no clearly defined basis upon which to rest a differential diagnosis; for while fever is a condition common to them all, from what are considered the same causes, there may arise disease manifesting itself as bloody murrain, dry murrain, or the Texas fever. This Texas fever is (*sic*) applied to the disease arising among local herds, consequent upon the passage of Southern cattle to the North, and differs in no respect, as to its post-mortem features, from the bloody and dry murrain which seem to spring from climatic influences. Its name, therefore, is derived not from any characteristic pathological lesion, but from its source of origin, — a distinction without a difference.

"So far as I am able to learn, the annual mortality among native Texas cattle in that section does not exceed three per cent., and death in these cases is not due to any specific disease, for it occurs almost exclusively among old animals — cows — which are unable to stand the winters and consequent want of prairie-grass.

"My interviews with a number of experienced stock-raisers elicited some conflicting opinions. It seemed to be agreed, however, that the passage of Southern cattle on the drive to the North did at times affect the health of local herds with which they came in contact, while it was at the same time admitted that these Southern herds were themselves free from disease."

Dr. Powell here gives the explanation offered him by a Mr. George Reynolds, that purulent matter from the sore feet of the traveling cattle is left by them in the grass, taken into the stomachs of the local cattle, and produces Texas fever.

"In proof of this fact, he (Mr. Reynolds) cites the case of a herd which, to his knowledge, a few years ago, passed along the southern bank of the Arkansas River, after which a great many cattle of the local herds on that side sickened and died, while those cattle which were on the other side of the river remained free from disease the entire season."

Upon receipt of the foregoing from Dr. Powell, I at once wrote to him for the names and addresses of the number of experienced stock men from interviews with whom he formed the opinions he refers to. Dr. Powell re-

plied he could give me the names of but four gentlemen, stock-raisers, viz.: George Y. Reynolds, J. B. Matthews, J. A. Matthews, and W. L. Bartholow, all of Fort Griffin, to each one of whom I at once wrote, asking for definite information on the subject. In due time I received a reply from Mr. J. B. Matthews, as follows:—

“FORT GRIFFIN, TEXAS, August 5, 1881.

“JOS. R. SMITH, *Surgeon U. S. A., San Antonio, Texas*:—

“*Dear Sir*,—Your favor of July 19, 1881, to hand, and in answer to your queries in regard to disease being communicated by Texas cattle, I beg to say that I have lived in Texas and been engaged in cattle raising for the last twenty years, and during that time I have had considerable experience in driving Texas cattle out of the State for market.

“I have at different times, during the period above alluded to, driven cattle from this portion of Texas to Colorado, to Old Mexico, and to Kansas, and I can say without the least hesitation that I do not know, nor did I ever hear, of a single instance of any disease being communicated by Texas cattle, either ‘along their line of march or at the end of their journey.’

“I live immediately on the great cattle trail that passes from Southern Texas north, *via* Fort Griffin, and in all the many herds that pass over this thoroughfare annually, I do not know a single instance of disease being communicated to our stock by passing herds. Indeed, I am quite sure there is no well authenticated case of disease being communicated in this way to be met with.

“I have often heard uninformed persons, who had no experience in such matters, in Kansas and Colorado, ascribe diseases of cattle, in some instances, to this cause; but a case of it, in all my long experience in the raising and driving of cattle, has never fallen under my observation.

“I was pleased to receive your valued favor on this important subject, and to have an opportunity to add my testimony in regard to this silly bugbear of disease being communicated by Southern cattle, which is, doubtless, invented by and manipulated in the interest of speculators, for the purpose of depreciating the value of Texas stock.

“Very truly yours,

(Signed)

“J. B. MATTHEWS.”

In the meantime, receiving no reply from the other gentlemen given me as authority by Dr. Powell, I again wrote, October 5, to Fort Griffin, to the gentlemen before addressed, and others, asking for any and all reports attainable. To this letter the only reply was from Mr. N. T. Eaton, and is as following:—

“FORT GRIFFIN, TEXAS, October 13, 1881.

“DR. J. R. SMITH, *San Antonio, Texas*.

*Dear Sir*,—Having had twelve or fourteen years’ experience with Texas cattle, I am certain that the disease you mention is contagious, and particularly so in case of improved cattle.

“I am now driving cattle from this place to my ranche in the Pan Handle neat Fort Elliott.

“Last year there was more or less loss to parties ranching and owning

cattle between this and Dodge City and Caldwell, Kansas, to which points the cattle trail leads to.

"Native cattle in the Indian Territory are also affected in the same way, when they are all improved stock.

"Parties ranching in the Pan Handle, and raising improved stock to drive to market, invariably lose more or less when they are forced to cross the cattle trail, or mix their stock with cattle driven from the South. To avoid this trouble the ranche men put off their drive until after frost falls. After that time they consider that all danger is passed. It was a long time before I became convinced of the fact that this disease was contagious. I now have no doubt of the facts. The further South the cattle come from, the worse they are to spread the fever, or what name you may give it.

"This disease is a hard question to deal with. I have driven cattle to Colorado, and have mixed them with the improved cattle of that country, on my arrival there, directly off the trail, when it is supposed they are most dangerous from fever. But I have never seen any improved cattle die in that country from the fever. It seems that after you get a certain distance west, there seems no further dread of the fever.

"In the extreme western portion of the Pan Handle, joining New Mexico, and the extreme western counties of Kansas, nearest Colorado, the disease is also unknown. Trail cattle can be driven to these sections without danger to either improved stock or to the trail cattle. The altitude of the country may possibly be the preventing cause of the contagion.

"Yours respectfully,

(Signed)

"N. T. EATON."

This letter being received, I at once wrote to Mr. Eaton, begging him to furnish me definite instances, if known, where cattle had been infected in the mode alluded to in his letter. No reply has been received to this last letter, nor has any reply been received from other persons at Fort Griffin. It was my intention, if any specific case was reported to me of disease so communicated from Texas cattle on their line of march, to visit the place in person and fully investigate the whole matter. But no one has reported any such case.

Dr. Powell has made further inquiries at Fort Stockton, and under date of October 29, 1881, writes me as follows:—

"I have had several interviews with the post butcher here, Mr. James Johnson, and learn from him that within the past three months he has lost about ten head of cattle, varying from five to two years of age, one calf about six months old among the number, and one Durham bull, one remove from imported stock. All these cattle died of what he terms the 'dry murrain.' He made two post mortems out of the whole number that died. The pathological conditions found were exactly similar in the two cases, and corresponded with those stated as existing in the cases that died of 'dry murrain,' and were examined by Mr. George Reynolds, of Fort Griffin. (See my letter of June last.)

"Mr. Johnson keeps on hand from eighty to one hundred head, and the extent of their range is from three to four miles around the post. Those he lost were the finest he had, — in best order in point of flesh."



Dr. Powell further reports that he has heard of some diseases on a ranche some seventy miles north of Fort Stockton, near Toyah Creek. From this disease some sixty-five young cattle were reported to have died.

I have requested Dr. Powell to investigate this epidemic and give me full particulars.

Dr. Havard, from Presidio del Norte, writes : —

"No prevailing disease of any kind ; but it has happened that two or three times during the last fifteen years (in very dry years, such as 1879) a large proportion (one to ten) of the herds about the Cheuati Mountains, and upper Chihuahua (Mexico), died, almost suddenly, without apparent cause ; cattle seemingly well sickened ; came to water, circled around a few times, and dropped down quivering, dying within twenty-four hours. I could ascertain nothing further about the cause or symptoms of this singular disease. I learn, however, that these dead cattle had a degenerated liver, or, as my informant stated, a *rotten liver*.

"I am told that a large proportion of skins along the Rio Grande contain the larvæ of a large cattle fly ; these larvæ are black, and nearly as large as hazel-nuts ; they do not seem to distress the cattle nor injure the hides.

"The cattle raised in this region, along the Rio Grande, about Presidio del Norte, and on the foot-hills of the Cheuati Mountains, all belong to the Texas and Mexican breeds. They appear to be in excellent health, generally keep in very good condition, and furnish beef of excellent quality.

"I have asked the principal cattle raiser in the town of Del Norte to give me in writing the diseases to which cattle are most liable in the northern part of Chihuahua, and he sent me the inclosed paper, which I forward, with a liberal translation.

" 'DISEASES PREVALENT IN CATTLE (NORTHERN BORDER OF CHIHUAHUA).

" '*Disease of the Bladder.* — Symptoms : Quietude ; wasting ; little or no appetite ; blood in urine, an indication of inevitable death. Having opened many cattle dead of this disease, the bladder was found full of blood. This disease prevails in the fall, and is somewhat contagious, or rather epidemic.

" '*Disease in the Head.* — Symptoms : Quietude ; tendency to drop the head ; little appetite ; intense dryness of the horns, to the point of looking (the anterior part) as if it had been exposed several days to the sun [*sic*] ; when they reach that stage they die. It has been observed that by cutting off in time a piece of the horns so as to make them bleed, many animals are thus saved. It is contagious.' [I think the writer means epidemic.]

" '*Disease of one of the Quarters.* — More common in young cattle. There is lameness, sudden ; on bleeding the affected part, the blood, as well as the muscles thereof, are black, while they retain their normal in the other parts of the body ; death follows in a few hours ; appears contagious [epidemic].'

" (These diseases appear periodically and are epidemic.)

"He is a tolerably intelligent Mexican, but, I fear, a poor observer, and his nomenclature is a most unsatisfactory one, and unfortunately the river

is so high that I cannot ride over to interview him. He makes no mention of tuberculous, lung, or liver diseases, of which I know there is a certain proportion, because, as I suppose, here these diseases, in cattle or in man, do not progress far, seldom develop fairly into the second stage, and are very seldom fatal; for instance, I have been consulted by a number of consumptive Mexicans around about here, in whom the incipient symptoms were evident, but I have not yet seen one with a tuberculous cavity.

"This variable climate does not prevent the inception of consumption, which is here as common as anywhere among the ill-fed and ill-housed poor, but it seems to possess the virtue of checking its development, although patients, as far as I have observed, do seldom entirely recover.

"I have questioned the principal butcher of Del Norte, a trustworthy, intelligent Mexican, in reference to pathological appearances. He said that he never saw tubercles in the lungs (they might readily escape his notice), but he had seen them rather frequently in the liver (in the proportion, he estimated, of from five to eight per cent.), and a little less frequently in the spleen. He described these tubercles as light-yellow masses scattered through the organ. The animals thus affected were mostly young, fat, and apparently quite sound, and the meat as readily sold and consumed as any other. The livers thus diseased are not sold, but I suspect they find their way to the kettle of the poor. Now is there any relation between the eating of the liver and meat of these tuberculous cattle and the mild form of phthisis prevailing here? It may be so, although this phthisis may be, I think, easily accounted for otherwise, in the great variations of temperature, and the utter neglect of hygienic precautions in shelter, food, and cleanliness.

"In reference to the last disease on the list, which might suggest charbon, I should say that I have not heard of anybody ever having suffered with it, and that apparently it is not any more common in Mexico than in the United States. As to age, the above-said butcher told me that he has often seen cows and oxen with their teeth worn out flush with the gum, and which he thought were from twenty to twenty-five years old when killed for the market."

Dr. Havard further reports the mortality (outside of the disease above described) as about ten per cent. "The deaths, mostly among the calves, are due to exposure or casualties."

Dr. Woodruff, at Fort Stockton, writes: "The cattle killed are this season in very good condition; fat and healthy, owing to the fine grass, and they showed no signs of disease. I have inquired of various stock-raisers who visit this post, and give the statements which several of them have made to me, and the conclusions they have formed.

"Mr. Rooney has one thousand head of cattle on the Pecos River. He lost fourteen head of cattle last year, and fifty-four this year.

"The disease has been among his cattle for three or four years. He made a post mortem examination of one animal, and found the gall bladder filled with material, black and thick as tar. Bladder distended with blood; spleen natural; kidney natural. The disease lasts about three days. Symptoms: the animal is sleepy; froths at the mouth.

"Mr. Richards says that he lost out of his herd, on the Pecos River, about fifty head last year, and fifty head this year.

"The disease prevails the most in October. His observations of a post-mortem examination is, that the spleen was black and soft; the first stomach contained weeds; the fourth stomach was natural; the bladder was empty.

"Mr. Kieeling, a stock-raiser on the Pecos, has found the bladder filled with black fluid. He thinks there is no disease among the herds on the Pecos, but the cattle eat poisonous weeds. He has a herd of 1,300, and lost none last year, but has lost eighty-seven this season. Cows and yearlings are affected, very few cows being lost. He has seen blood come from the mouth.

"Mr. James Johnson, who has a small herd in the vicinity of the post, has lost two head this season. The animals urinated blood, and the bladder was filled with blood.

"The shoulders are much ecchymosed; there is running at the nose of white, slimy matter; abdomen much swelled, and wind escapes upon puncture of the abdominal walls.

"The cattle, in his opinion, do not die of old age, nor starve to death. He cannot speak with certainty of the nature of the disease."

"Mr. Peirce, a large stock-raiser, thinks it is a poisonous weed which destroys the cattle. This weed is known as *Yerba Ioca*, and although I have diligently sought it, I have not been able to find it. There is none in this immediate vicinity, but it abounds on the Pecos, it is said.

"Judge Frazer has a herd of cattle at Leon Springs, nine miles from the post, numbering four hundred animals.

"He describes what he calls an alkaloid disease, which results from drinking too much salt water. They grow stiff in hind and fore shoulder, the head swells, they dribble at the mouth.

"He lost sixty head in one season from the above cause. He also states that it is the young animals in the herd, and the old generally escape.

"I have found, from my observations, that the cattle in this vicinity are in much better order than they were last year, when there was a dearth of grass.

"Beef is the only fresh meat procurable in this region, and it is eaten two or three times a day by all. I know that the beef is far superior to that of last year.

"The increase of mortality in the herd of Mr. Kieeling, on the Pecos, has arisen, I am much inclined to think, from the eating of poisonous weeds.

"The number of cattle near the post is very small; there are no Northern cattle among them; they consist entirely of the native breed."

Dr. Girard, from Fort Davis, reports: "At Fort Davis the beef contractor purchases his cattle, as a rule, in the valley of the Pecos River, where the greater portion have been raised, the parent stock having been brought from other parts of Texas.

"Two or three parties are engaged in improving their small herds by the introduction of foreign blood; as far as I could learn, the imported animals



are all bulls, and were part of a herd of some three hundred head, of more or less pure Durham breed, which were brought from Kentucky to New Mexico in 1876. There are but few of these animals in this vicinity, and they do not appear to have suffered from any disease since their arrival in this region. I understand, however, that among the present herd, when first imported into New Mexico, a number died from eating a certain 'thistle.'

"The cattle raised about Fort Davis are, according to all accounts, perfectly healthy, and have not suffered from any disease or epidemic for years. I hear, however, of a certain 'murrain' which killed a number of them near Fort Stockton, two or three years ago; what affection this 'murrain' was, I cannot well make out. A few animals, it seems, die every spring from drinking the impure and nauseous contents of half dried up 'water-holes,' where the water lies stagnant through the winter.

"At Toyah Creek, some thirty miles north of Fort Davis, a few cattle died last summer from eating certain plants, the character of which I have not been able to ascertain. With these exceptions, the cattle of this country enjoy sound health, and mostly end their lives in the shambles, a few dying occasionally of starvation or old age.

"As to the annual mortality among the herds, no positive answer can be given, so few animals dying from natural causes; the greater number of them are perfectly healthy, and are slaughtered for consumption while still comparatively young; this applies particularly to steers, while cows are allowed to live for the milk they furnish. Some well-informed men tell me that were the herds not interfered with, the annual mortality would not average more than eight per cent."

Dr. Brown succeeded at Fort Davis the writer of the last quotation, Dr. Girard. Dr. Brown writes from that post as follows:—

"The following facts in regard to a curious disease among the cattle, produced by eating the *Astragalus mollissimus*, are obtained from a variety of reliable sources, and may be depended upon as authentic. There is a brief allusion to this affection in a communication from Assistant-surgeon Peter Moffatt, U. S. A., Fort Garland, Colo. ("Report on Hygiene," p. 258.)

"The plant is there mentioned as the *Oxytropis lambertii*, but I am assured by Assistant-surgeon V. Havard (who carefully examined some specimens at my request) that this is an error, and that the herb in question is an *Astragalus* and not an *Oxytropis*. This plant, called by the Mexicans *Yerba loca*, or mad-weed, is one of the first to make its appearance in the spring before the grass has grown to any extent. If the animals once get a taste of it they acquire an inordinate fondness for it, and will neglect all other food to obtain it. A short time after it is eaten it produces a species of intoxication, with symptoms not unlike those of *mania à potu*. The animals become wild, run around in an aimless way, tossing the horns and lashing the tail. There is a great fear of passing objects, and conception of distance and size seems to be lost. A stick in the road looks as big as a log, and they will jump ten feet in trying to get over it. They will run directly against a wall or house, from lack of perception of the distance it is from them. Intolerance of light seems to be marked. When the acute

symptoms pass off diarrhœa sets in, the coat gets rough, and the hair falls out; the animals grow poorer and poorer, with great weakness and anorexia, and finally die emaciated to an extreme. In cases of recovery it is said that they are liable to another attack the ensuing spring, without further indulgence in the noxious weed, but I have my doubts of the truth of this statement. It is also said to produce toxic effects when administered to human beings, and to be in use by the humble 'Brinvilliers' of Mexico to relieve themselves of obnoxious parties; but I have not been able to secure any definite information on this point.

"I inclose herewith specimens of the plant in question. It is now too late in the season to obtain the blossom, which is a purple cluster, not unlike the garden larkspur.

"I also think it worth while to mention a peculiar fetidity of the milk of the cows in the spring of the year. This is so offensive as to be almost undrinkable, and a singular peculiarity about it is, that the fetid smell and taste is greater after the milk has stood some hours than it is when first drawn from the cows. I have carefully investigated this phenomena, and have come to the conclusion that it is due to the ingestion of the *Cucurbita perennis*, a species of gourd which is very common here, of the young succulent leaves of which the animals are very fond in the early spring before the grass has grown.

"I inclose a specimen of the leaf. In the green state the peculiar odor can plainly be perceived."

Now, after all the foregoing, I regret to be obliged to present this report still incomplete; that is to say, I believe that many important facts are yet to be collected bearing on this subject, and, therefore, final conclusions may not yet be drawn. The post mortem observations I present are worthy of entire reliance. With but few exceptions they are of healthy animals. Pathological appearances have been described heretofore by many observers.

I think, too, the facts here reported prove that the herds of Texas cattle, when grazing on their prairie pastures, are singularly free from disease, — certainly from any disease recognizable by the ordinary tests of disease, namely, symptoms and pathological appearances.

If so many assertions had not previously been made, and so many witnesses heretofore cited, where Texas cattle, apparently healthy, had infected other cattle, mingling with them crossing their line of march or following them in their grazing grounds, the inference from the foregoing would be undoubted, that there was no danger to be apprehended to other cattle by exposure to cattle from Texas. Whether some of these instances do not deserve another interpretation is in my mind a question. Certainly, in many of them, accounts of which I have perused, there is no such rigorous analysis of facts as shows the conclusions drawn to be inevitable.

From the fact that imported cattle from the North soon after arrival in this Southern clime sicken and die in great numbers, it cannot be logically concluded that such death results from infection from Texas cattle, and certainly in many instances of this kind not the slightest evidence is offered of any intermingling of imported and natives. On the contrary, as in the

case quoted on page 244, "Transactions American Public Health Association," vol. vi., it is stated by the owner of the Durham stock, that sickness and death appeared among his newly imported Durhams before their arrival, at and on the way to their home near Mason.

It is well known to importers of fine horses in this country that considerable risk attends their importation, and this, when kept by themselves in cities, and in private stables. Emigrants, too, are subject to disease, not all of them, but a sufficient proportion to make the matter an element in considering the subject of emigration.

Now this sickness of newly-arrived men and horses has always been considered due to some acclimating process. The idea does not lack probability that the sickness and mortality among the imported cattle are due to a similar acclimating process.

The weight of the spleen deserves careful consideration. The mean of all my figures gives the weight of the spleen as exactly two pounds. The spleen of Texas cattle, weighed under the supervision of Dr. Rauch, in Chicago, gives an average weight of two and a half pounds, while those of the natives reported by Dr. Rauch (Illinois probably, or vicinity) average less than one and a half pounds. The ages of these cattle are not given.

Dr. Powell, at Fort Griffin, found that the weight of spleens increased regularly at different ages up to five. The figures deduced from all my reports agree with this. The average weight of spleen, classed according to the age of animals, was as follows:—

In animals aged two years, 1.68 pounds. In three-year animals, 2.18 pounds. In animals aged four years, 2.45 pounds. In five-year animals 2.85 pounds.

If the animals reported in Chicago were three, four, and five years old, according to the weights just given for those ages, the weight of the spleen should have averaged two and a half pounds.

The spleen further appears, according to my observation, to vary with the weight of the animal generally. From Fort Ringgold, Texas, I have quite full data from seventy-four animals killed for beef, and I take this place because every animal reported from there is fully reported.

Of all these beeves the average net weight was	301 pounds.
Of thirty-eight, the weight of whose spleens was between one and two pounds, average weight was	267 pounds.
Of twenty-seven, the weight of whose spleens was between two and three pounds	346 pounds.
Of nine, the weight of whose spleens was between — and three pounds	312 pounds.

Before inferring, then, from the weight of spleens as to the health or disease of the animal, it certainly may be demanded that the weight and age of the suspected animal also be given. There is abundant reason, from the figures and statements of this report, to believe that the spleens of cows in this climate are heavier and larger than those of Northern cattle. The average weight of all the spleens here reported was 1.98 pounds (almost exactly two pounds), and the reports are from all over the State. There is no part of the State where there is less reason to believe that disease exists



among the cattle than in the vicinity of Forts McKavett or Mason ; yet in Dr. Waters' report from there he says that "only three or four (spleens) weighed as low as one and a half pounds." In numerous cases where the spleen weighed two and a half pounds and upwards, the observer has distinctly said that all the other organs seemed healthy, or that the animal appeared in good health. Our knowledge of the functions of the spleen is still quite imperfect. The numerous observations of Dr. Rauch, that where the spleen was of unusual size, the liver varied inversely, — being unusually small, — would at least give ground for suspicion that in these cases the functions of the two organs might be complementary.

Certainly the Darwinian can see no difficulty in the conclusion, that a two pound spleen may be a normal organ in Texas, and a one and a half pound spleen a normal organ in Illinois.

Professor Gamgee made a number of post-mortem examinations of cattle in this State. His exact language I am unable to quote, as I have no access to his report, but only to that version of it on page 114, "Special Report No. 22, Department of Agriculture," 1880. From this it appears that Professor Gamgee found an "abnormal weight of the spleen, coupled with gastric redness, erosions, pale blood, and frequently the presence of bloody urine in the bladder." Undoubtedly these animals were diseased, and these pathological appearances so prove. The citation does not state that they were not recognized as sick before this revelation by the post-mortem knife, but the context makes this the natural conclusion. With my present experience with diseased cattle, it does not appear to me possible but that a proper examination before death would have discovered the ill-health of these animals. Observations as to the weight of healthy spleens will be continued by me during the coming year.

A few words in reference to the temperature observed in cattle : —

Before beginning my study of this subject, my ideas of the temperature of cattle were quite vague, and the first reports received from Corpus Christi, where the average temperature appeared as over 103° F., staggered me.

Could their natural temperature be so much higher than that of the human body? But not only were the next reports conformable to this first one, but *all* received were to the same effect, and the average temperature of forty-five cattle, as reported to me by five different observers, was 102.59°.

I know of no observations made for the purpose of determining the normal temperature of these animals.

In looking over the volume of "Researches, Physiological and Anatomical," by John Davy, published in London, 1839, I found some experiments reported by him.

He states that the temperature of the blood of an ox flowing from the carotids was 100° in summer, at Edinburgh, and that the temperature of an ox ascertained the same way in Kandy, May 28, was 102°, the atmosphere at the same time being 80°.

When, further, I saw the temperature of fever in these animals, as ob-

served by Professor Gamgee, given as from  $106^{\circ}$  to  $110^{\circ}$ , I came to the conclusion that the normal temperature of cattle exceeds the human temperature four or five degrees.

Further observations in this direction will be made during the ensuing year.

I must again repeat that in this report, and the one on this same subject made to the Association in December, 1880, I have been trying to ascertain whether the cattle of Texas are habitually unhealthy or diseased; whether any such disease prevailed among them as made them dangerous as sources of infection if driven to Northern markets, and to find out whether it ever occurred that these cattle, being themselves healthy, could nevertheless communicate not only once, but habitually, disease to healthy cattle with which they came in contact. The Texas or Spanish fever, pleuropneumonia, and other diseases, have from time to time been investigated and described by competent observers. From Dr. Rauch's full report on Texas fever, made to the Chicago Board of Health for 1868, I make a few extracts, as bearing on the subject I am pursuing. Page 203, Dr. Rauch says: "This disease is undoubtedly transmitted by native to native in the same manner as by Texas to native," and he cites a case on the same page where "native cattle were purchased at Chicago in August and taken to Lebanon County, Pa., and that a short time after they died, and that other native cattle of the same farm and neighborhood died; and that no Texas cattle had been nearer the place where these animals died than the railroad while in transit to New York and Philadelphia, which must be at least three miles distant." Dr. Rauch further says: "The assertions that native cattle die of this disease, and do not communicate it to other native cattle; that Texas cattle are perfectly healthy, and still cause disease that is fatal to native cattle, and that they do not die of this disease, are such anomalies in the history of contagious diseases that, on general principles, we could not believe them."

The legitimate deductions from the reliable facts and statements contained in this present report are entirely in harmony with the views enunciated by Dr. Rauch.

## X.

### A REPORT OF THE EXAMINATION OF HOGS AT THE NEW ORLEANS ABATTOIR DURING THE SUMMER OF 1881, WITH ESPECIAL REFERENCE TO THE PRESENCE OR ABSENCE OF TRICHINÆ SPIRALIS.

BY THE NEW ORLEANS AUXILIARY SANITARY ASSOCIATION, G. B. WHITE,  
M. D., SANITARY DIRECTOR.

IN the year 1871, by the direction of the writer, a number of hogs were examined by Dr. C. P. Ames, Sanitary Inspector of the Board of Health, now deceased, to ascertain whether the inhabitants of New Orleans were exposed to much practical danger from the presence of trichinæ. The number of specimens examined was about four hundred, and represented about two hundred animals.

In 1874 and 1875, Dr. Gustavus Devron, then Sanitary Inspector to the Board of Health, made frequent inspections of the abattoirs, and on such occasions examined for trichinæ all the hogs ready for market.

No trichinæ were ever found, and as danger from this source was evidently not threatening, further investigation at that date ceased. An examination in March, 1880, of the records of the abattoir, which showed that more than two thousand hogs were consumed from the public markets each month by the citizens of New Orleans, led the Sanitary Association to make a methodical and complete investigation of the subject. The report of Dr. Jansen T. Payne, to whom the work was committed, follows. As the results of all investigations so widely diverge from all published East, North, and West, it is proper to say that specimens were examined by Dr. Devron and myself from some hundreds of animals, that, if deemed necessary, we should be able to certify to the accuracy of the work.

#### REPORT OF DR. JANSEN T. PAYNE.

I began my investigations at the slaughter-house adjoining the lower limits of the city on the 7th of April, and finished my labors October 8, 1881.

The method of conducting the researches was as follows: I went to the slaughter-house nearly every afternoon at three o'clock, and obtained from the hogs as they were slaughtered as many as four specimens of the muscular fibre from each animal to be examined, and placed them in small vials properly labeled. The examples procured one afternoon were examined the following day by the aid of a good microscope, capable of magnifying objects two hundred diameters. A low power was found to give



greater satisfaction than a higher one could have done, and observers in this field will do well to bear this fact in mind. The parts examined were from the pectoral, diaphragmatic, abdominal, and ham muscles. A record was kept of each hog examined, and the following facts were noted as far as possible:—

The condition of the hog, the locality from whence he came, his food, and other facts when known, were recorded.

The whole number of hogs slaughtered from September 1, 1880, to September 1, 1881, was 27,034. I examined 21,600 specimens taken from 5,400 hogs. When it is taken into account that each of the specimens had to be separated into minute shreds before they were placed upon the stage of the microscope, and a considerable number of fibres examined in each case, so as to ascertain whether the meat was or was not infected with trichinæ, it will readily be perceived that it is impossible to make anything like an accurate guess as to the whole number of pieces of muscular fibre examined.

The number of hogs examined each month, and the number found to be infected with trichinæ, may be stated as follows:—

Month.	Hogs.	Infected.
April . . . . .	325	0
May . . . . .	1,065	1
June . . . . .	1,015	0
July . . . . .	621	2
August . . . . .	1,183	10
September . . . . .	1,191	9
	5,400	22

The animals examined were reported to have been received from the following localities:—

Tennessee . . . . .	1,060
Ouachita district . . . . .	2,473
St. Louis . . . . .	529
Texas . . . . .	57
Mississippi . . . . .	158
New Orleans . . . . .	116
The West . . . . .	484
England . . . . .	2
Louisville . . . . .	241
Unknown . . . . .	280
Total . . . . .	5,400

The following table shows the number of trichinæ found in one grain of each of the following named muscles:—

	Pecto- ral.	Dia- phragm.	Abdom- inal.	Ham.	Total.
Hog No. 1 . . . . .	—	9	—	—	9
Hog No. 2 . . . . .	4	9	2	3	18
Hog No. 3 . . . . .	31	74	65	218	388
Hog No. 4 . . . . .	262	120	105	188	675
Hog No. 5 . . . . .	—	20	22	—	44
Hog No. 6 . . . . .	12	—	22	—	34
Hog No. 7 . . . . .	60	76	152	4	222
Hog No. 8 . . . . .	98	52	166	136	442
Hog No. 9 . . . . .	—	8	3	—	11
Hog No. 10 . . . . .	181	294	119	92	686
Hog No. 11 . . . . .	39	118	79	22	258
Hog No. 12 . . . . .	—	120	17	260	397
Hog No. 13 . . . . .	27	83	13	29	152
Hog No. 14 . . . . .	14	64	21	33	132
Hog No. 15 . . . . .	19	40	37	16	112
Hog No. 16 <sup>1</sup> . . . . .	—	—	—	—	—
Hog No. 17 . . . . .	13	49	25	14	101
Hog No. 18 . . . . .	—	17	15	3	35
Hog No. 19 . . . . .	2	7	19	6	34
Hog No. 20 . . . . .	13	22	25	9	69
Hog No. 21 . . . . .	16	24	13	38	91
Hog No. 22 . . . . .	92	219	85	102	498
	885	1,815	1,003	1,173	4,386

<sup>1</sup> Not counted, but very highly infected with trichinæ.

The infected animals were reported as having been received from the following places: St. Louis 18, Louisville 2, and from the West, marked "unknown," 2, making a total of infected hogs, 22. Six rats taken in the buildings of the slaughter-house company and examined by the microscope were found to have no trichinæ.

The St. Louis hogs were kept in pens by themselves, and some of them remained at the slaughter-house for nearly a month before they were killed.

In some of these St. Louis hogs it was observed that there was an old, and also a recent, infection, some of the trichinæ being very young, and others encysted, showing that they had reached a state of maturity.

In one instance three full-grown trichinæ were inclosed in one sack.

In one case gritty particles were found in the muscle, and were believed to be the result of a very old infection.

A considerable variation in the size of the trichinæ was observed, not only in the young, but in the fully developed parasites.

Some of the young trichinæ were held under observation for nearly an hour, but in one instance only could it be said that one of the worms appeared to have made a little progress in his journey through the muscle. A number of the young trichinæ seemed to be forming about themselves a membrane much in the way the maggot of the common house-fly forms his pupa case.

The observations made here appear to establish the fact that hogs infect each other when inclosed in the same pen, and do not depend upon the rat as an intermediate host. The parasite is passed out of an infected animal

along with undigested food, and the food is then eaten by a sound hog, who in turn becomes infected.

By this series of examinations it has been ascertained that Southern bred hogs are free from trichinæ. All the hogs infected with them are corn-fed animals. No mast-fed animal was found to be infected. The swill-slops and offal-fed hogs appeared to have the fairest and best meat when inspected by the unaided eye, but under the microscope their flesh presented a bad appearance, being cloudy, and the cells often broken down and disorganized, as if the tissue were infiltrated with particles of dirt. The corn-fed hogs were the most solid and showed the best fibre. The mast-fed hogs were oily and soft. The clover-fed hogs were rather poor, and the fat had a yellowish tinge.

It was found to be a very easy matter to decide on what kind of food an animal had been raised by an inspection after he had been slaughtered and dressed for market.

The sanitary recommendations made were as follows:—

An improved trough should be made to contain the food of the hogs, and corn should not be scattered over the floors of the pens, as is customary at present, for by this means the corn finds lodgment in the dung, and thereby becomes a vehicle of infection. The pens should be kept very clean. When one hog of a lot is found to be infected with trichinæ, the animals should be separated, and not more than one hog placed in a pen.

By a rigid system of inspections, it is possible to prevent the sale of fresh pork infected by the trichinæ spiralis.

(Signed)

J. T. PAYNE, M. D.

NEW ORLEANS, *October 31, 1881.*

Dr. C. A. Simpson, now of Roswell, Ga., writes: "Up to July 1st I examined microscopically thirty hogs without finding trichinæ. In most cases two to four parts of each hog were examined. In a few instances only one part was left unsold when I reached the butcher stall. These hogs were raised in Tennessee and Georgia. . . . The majority of them from Tennessee."

This investigation, though limited in numbers by the season of the year, and by the removal of Dr. Simpson from Atlanta, corroborates the conclusion forced by the New Orleans investigations and figures, that trichinæ are not found in Southern raised pork.

I offer also a report of examinations lately made at Nashville, Tenn., by Prof. R. W. Steger, M. D. Dr. Steger reports one hundred and eighty hogs, but no trichinæ.

The New Orleans Sanitary Association conceives that its investigations carry results of wider importance than the demonstration that the danger to pork eaters of New Orleans from trichinæ is exceedingly small. It proves that large portions of the country are entirely free from them, and that in certain parts of the United States hogs can be packed for foreign markets, with the great probability that the safety of the consumer lies not in careful cooking, but in the sound health of the animals slaughtered.



Important problems to be settled are the preliminary determination of the extent and marginal lines of infected and non-infected districts, by legal restrictions based on scientific observations and recommendations ; to prevent the spread of infection into those now fortunately not infected ; to adopt measures to diminish infection where now existing, and if not possible to eradicate the evil, to bring it, both in frequency and force, to a minimum.

The Association asks further, if the time be not ripe, not alone to endeavor to secure examination of slaughtered animals, and rejection of the unsound, but to include in the scope of investigations and remedy rinderpest, swine fever, splenic fever of cattle, and in general all the diseases and parasites of food animals, and the adoption of general measures whereby the movement of live food animals shall be under inspection, and none be passed from one district to another save by certificate of a qualified veterinary surgeon or medical officer.

The Sanitary Association perceives that only national authority and means are competent to attain the ends believed necessary. It therefore prays the American Public Health Association to refer the matter to such committee as it may deem proper, and adopt resolutions calling on the General Government for the immediate organization of the inquiry, and for such action by Congress as may be found requisite.

## XI.

### TRICHINÆ SPIRALIS: ITS HISTORY, PATHOLOGY, AND DIAGNOSIS.

By J. M. PARTRIDGE, M. D.,

*South Bend, Ind.*

THE ancient Romans sought to improve their race in physical vigor by destroying their feeble and deformed offspring. And the Greeks, in their admiration of the human form in the beauty of its perfect and healthy development, deified and worshiped the goddess Hygeia. But the sanitarian of to-day, by the aid of medicine and surgery, not only seeks to develop the feeble into the full strength and vigor of manhood, and to restore the deformed and unsightly to perfect forms of health and beauty, but he does more and better for humanity. He goes without, and, by the aid of the laboratory and the microscope, he discovers and brings to the light the deep-hidden and hitherto mysterious *causes* of disease, deformity, and death. Pursuing these investigations the subject of parasites and parasitic diseases demands at least some portion of our attention. Parasites infest both the vegetable and animal kingdoms, and are doubtless transmissible from the one to the other. It is well understood and susceptible of proof that carnivorous animals obtain their parasites from their food, that is, from the flesh of their victims, and, in the absence of proof to the contrary, it is fair to infer that herbivorous animals obtain parasites from the vegetable food on which they subsist, and it appears that diseased or blighted vegetation is most likely to be infested with parasites, and, moreover, that the "blight" in plants is a parasitic disease. It is universally observed that famine and pestilence go hand in hand, and it is evident that the pestilential diseases which famines engender are due, not so much to an actual scarcity of food as to the unhealthy or diseased condition of the same.

The law of migration and development of parasites, although as yet but partially understood, is certainly full of the deepest interest and worthy of the most profound investigation; and that student of nature who shall penetrate the unexplored regions of the vegetable parasites, with such satisfactory results as have attended Cobbold, Lenckhart, and Zenker, in their researches among animal parasites, shall not only, like them, bring treasures of knowledge of inestimable value into the storehouse of science, but shall also write his name high on the immortal tablet of fame.

But the department of medicine and sanitary science is most interested in investigating the origin, history, and destiny of those parasites affecting animals, and especially the human race.

Of these there are thirty-one distinct species found in man alone ; some very numerous, and others but seldom seen ; some are monsters in size, and others invisible to the eye unaided by a powerful microscope. There are also different species, and different varieties of the same species in different countries and races of men. One variety of the tape-worm (*tænia echinococcus*) is found among the islanders ; another (*tænia mediocanellata*) has a partiality for the Russian stomach ; the long tape-worm (*tænia solium*) is found most commonly in Great Britain ; and the broad tape-worm (*bothriocephalus latus*) prevails on the continent of Europe ; and these last two varieties are found to some extent this side of the Atlantic, while the ascaride inhabits infantile intestines, and tortures infant nerves in all lands and among all nations.

In the development and migration of parasites we notice that they have different forms of existence in different habitations.

They become sexually mature only in the open cavities of the body, as the alimentary canal ; but in their immature condition they exist as larvæ in the substance of the tissues ; and these larvæ have not the power of further developing into maturity until carried into the stomach of some other animal. It is also true that if the ova of some mature parasite are carried into the stomach of different species of animals, these same ova will in the different animals develop different species of larvæ. If a section of the serrated tape-worm of the dog is introduced into the stomach of the rabbit, it will produce in the muscles of the rabbit the encysted parasitic larvæ *cysticercus pisiformis*. And conversely if the flesh of the rabbit containing these encysted parasites be fed to a dog, these encysted larvæ will be transformed or rather developed into the mature tape-worm.

It is also true that if a section of the aforesaid tape-worm containing ova is carried into the stomach of the ox, it will produce in his muscles a different species of larvæ, the *cysticercus tenuicollis*. In the stomach of the hog the same ova produces the *cysticercus celulosæ*, while in the sheep is produced the *cœnurus cerebralis* ; and any or all of these different species of larvæ or encysted parasites, the *pisiformis*, *tenuicollis*, *celulosæ*, or *cœnurus*, will, in the stomach of the dog, be developed into one and the same parasite, the mature *tænia serrata*.

But from this general reference to parasites and parasitic development, we pass to the discussion of one particular species, and that, although in size one of the least of its race, it is in its effects the most terrible and deadly foe to man, — the *trichinæ spiralis*. The venomous rattlesnake sounds the battle-cry as he attacks his victim, but this accursed foe gives no note of warning, until by stealth he has gained the citadel of life, and we are powerless for a defense.

This parasite is introduced into the human system by eating flesh containing its immature larvæ. It is found occasionally in most warm-blooded animals, but chiefly in the hog, and from this source man is universally infected.

The immature parasite, as discovered by the aid of the microscope, is a serpent-shaped worm about one twenty-fifth of an inch in length, and lies spirally coiled up within oval-shaped cysts.



When flesh containing these immature encysted larvæ is taken into the stomach the parasites are liberated from their cysts by the process of digestion, and in two days' time have reached their adult or sexually mature condition.

In two or three days more the female brings forth an innumerable brood of hair-like larvæ, which immediately commence their work of destruction by penetrating the intestinal walls and seeking their destination in the muscles, which they probably reach through the circulation of the blood. Here their presence is most certainly and sadly manifested. Lacerating the fibres and penetrating the muscles, they gorge themselves with flesh, so that in two weeks' time, or about three weeks from the time they were taken into the stomach, they have attained their first form of development, and now become encysted larvæ. Here they must remain forever dormant, unless at some time taken into some unfortunate stomach, there to be liberated and permitted to repeat the work of destruction and death.

This parasite was observed as early as 1828 ; but it was not until a later date that Professor Owen gave it a scientific description, and the name *trichinæ spiralis*. In 1860 Professor Zenker first discovered the dire and deadly malady which this parasite induces, and gave the first description of the disease, *trichinosis*.

This terrible disease, trichinosis, has heretofore been very difficult of diagnosis, from a general lack of knowledge on the subject ; but the development of the disease, as indicated by the different stages and locations of the parasite, should enable the careful observer to determine its existence with great certainty.

DaCosta believes that in most cases there is no certainty of diagnosis short of vivisection and actual microscopic examination of the flesh of our patients ; but if we bear in mind that this disease has its different and distinct stages of development, and having in any case a *suspicion* of trichinosis in its first stage, and in due time there follow definitely marked characteristic symptoms of the second stage, our suspicion of a *possibility* has now advanced to a *probability*. And, moreover, if there supervene in their appointed time and order prominently characteristic symptoms of the third and fourth stage, we may be as positive and unerring in our diagnosis as in most other diseases. From these general observations in trichinosis, I proceed to state as concisely as possible my views of its pathology and diagnosis.

1. When by eating infected and imperfectly cooked meat the parasite is taken into the living stomach in its encysted and dormant state, and by the process of digestion it is liberated from its cell and restored to active life ; it immediately attacks and attaches itself to the mucous membrane of the stomach and bowels, with which it is brought in contact. For about two days it lacerates and gorges itself with this mucous surface, and when becoming sexually mature it deposits thousands of young hair-like larvæ, which immediately attack and for two days more greatly exaggerate this *mucous irritation* and *inflammation*, which is the characteristic pathological condition of the first stage. The diagnostic symptoms of the first stage are

manifestly "frequent, uncontrollable, and long-continued vomiting and purging of mucus, with terrible nausea and loathing of food and drink." Beyond the first stage or period of mucous irritation, the original or parent parasite is not recognized.

2. In the second stage the young parasite pierces the stomach and intestines, and invades the adjacent glandular structures, causing irritation and inflammation of these organs, and producing a pathological condition similar to that of typhoid fever in its earlier stages. The symptoms of the second stage are "pain and soreness of the bowels, with tympanites, low, continued fever, diarrhoea, debility, loss of appetite, and of sleep, closely resembling those of typhoid fever."

3. The parasite next manifests itself in the muscular system, the method of reaching which has hitherto been a disputed point, whether by continuously perforating and traversing the solid tissues, or by the circulating system. The probabilities, however, seem to favor the latter opinion. Indeed, I have a case in point that seems to demonstrate it. Among my patients was a nursing child of whom the mother affirmed that it had not tasted the infected meat, and yet this child had the same symptoms as other members of the family of trichinosis in the third and fourth stages. Evidently the child received its parasites through the lacteal circulation. It is fair to infer, therefore, that the parasites are carried from the lacteal into the general circulation, thence distributed by the capillaries through all the muscular structures. Here their presence is soon painfully realized; penetrating and lacerating the tissues they gorge themselves therewith, until in a few days they have attained their growth and first form of development. This mutilating and consequent inflammation and weakening of the muscles constitutes the characteristic pathological condition of the third stage. The diagnostic symptoms in the third stage are "excessive swelling, soreness, and weakness of the muscles with fever, great anxiety, and dyspnoea, the symptoms closely resembling those of inflammatory rheumatism."

4. In the fourth stage the parasite has weakened the muscles of respiration and invaded the lung tissues, inducing active inflammation and disorganization. The symptoms of the fourth stage are "greatly increased dyspnoea, frequent coughing, with sanguino-purulent expectoration, excessive bloating of the face and extremities, anxiety, sleeplessness, and utter prostration." And if these different stages in their order have been severe, the patient dies, certainly and speedily, with symptoms of typhoid pneumonia.

In a recent epidemic which has come under my observation, fourteen persons were sick. Two died, and four more barely escaped the same fate. The survivors were from six to fourteen months in regaining their strength and vigor.

This epidemic was caused by eating raw or partially cooked meat from a hog which had been culled from a car-load of live hogs, as not being in good condition for shipping. The case which Professor Zenker observed so carefully, and to which we have before referred, he found to have been caused by eating sausage made from a pig which the owner considered to have been in poor condition. It is manifestly the duty of physicians to warn their pa-

tients against the danger of eating raw or imperfectly cooked pork. It may come within the province of this board to suggest, and may be the duty of State Boards of Health to demand, such legislation as shall prohibit, under severe penalty, the sale of any animal, or the flesh thereof, which does manifest, or has at any time manifested, symptoms of being diseased, without having such flesh properly examined by the microscope and proven to be not infected.



## XII.

### REPORT OF EXAMINATIONS FOR TRICHINÆ, OF HOGS KILLED AT SAN ANTONIO, TEXAS.

By JOSEPH R. SMITH, A. M., M. D.,

*Surgeon U. S. A., Medical Director, Department of Texas.*

At the suggestion of Dr. White, President of the American Public Health Association, I undertook the examination of flesh of hogs slaughtered at San Antonio, with the view of ascertaining if trichinæ were present, and if so, in what proportion.

In this work I obtained the aid of Dr. William Myers, Acting Assistant Surgeon U. S. A., who secured the specimens, and gave the subject constant personal attention.

It must be understood that this place is no market for hogs for packing. Hogs are only killed here for home consumption. Consequently this report embraces only the results derived from the examination of about 1,600 different specimens from 330 different hogs.

The specimens of meat examined under the microscope were from the pectoral muscles, the diaphragm, the abdominal muscles, the ham, and shoulders of each animal.

Of these hogs 143 were raised on the prairie, eating mast, and not receiving other food; 70 were fed on offal alone; 18 were fed on slops alone; 33 were fed on corn alone; 6 were raised on milk alone.

Into the food of all the others offal and slops entered as a constituent, generally mixed with corn.

Of the 330 there were 73 fat hogs, 168 lean hogs, and 89 in middling condition.

Of this number 126 were raised in or near the city of San Antonio, and 204 in the neighboring country, embracing seven counties. The specimens were obtained from 26 butchers.

Of these 330 hogs two were found infected with trichinæ, which is 0.6 per cent.

Of these two infected hogs the one first discovered was killed June 11th, and examined June 12th. The animal was nine months old, and in middling condition. It was born on the prairie, in Bexar County, and kept for six months in a butcher's pen in the city, during which time it was chiefly fed on slops and offal. Rats frequented its pen, but no privy was near. Trichinæ were found only in the pectoral muscles of this hog, where the mature and young migrating trichinæ were observed, not encysted. Although about fifteen other specimens of meat from this hog were examined, and from the muscles above named, no other trichinæ could be found. Careful search was made by both Dr. Myers and myself.

*Record of Examination of Hogs for Trichine at San Antonio, Texas, April to November, 1881.*

No.	Date of Killing.	Butcher.	Pectoral Muscles.	Diaphragm.	Abdominal Muscles.	Ham and Shoulder.	Locality.	Food.	Appearance.	Remarks.
1	April 7.	Michel.	No trich.	No trich.	No trich.	No trich.	Atascosa Co. Country.	Corn.	Middling.	Bought 14 days ago; since when kept in pen in city; no privy near; rats.
2	April 7.	Hoefling.	"	"	"	"	"	Prairie.	Middling.	Several months in pen outside city; corn.
3	April 8.	Michel.	"	"	"	"	Wilson Co.	Prairie; some corn.	Lean.	Eight days kept in pen in city. Same as No. 1.
4	April 9.	Michel.	"	"	"	"	Atascosa Co. Prairie.	"	Lean.	Eight days kept in pen in city. Same as No. 1.
5	April 9.	Michel.	"	"	"	"	Bexar Co.	Corn.	Fat.	Eight days kept in pen in city. Same as No. 1.
6	April 9.	"	"	"	"	"	Bexar Co.	Mast.	Fat.	"
7	April 9.	Hoefling.	"	"	"	"	Bexar Co.	Prairie.	Lean.	Several months in pen outside city; corn.
8	April 9.	Schultz.	"	"	"	"	City.	Offal.	Lean.	Pen inside city; rats.
9	April 9.	Schultz.	"	"	"	"	City.	Offal.	Lean.	Pen inside city; rats.
10	April 9.	Schultz.	"	"	"	"	City.	Offal.	Lean.	Pen inside city; rats.
11	April 11.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Middling.	Pen inside city; rats.
12	April 11.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Middling.	Same as No. 3.
13	April 12.	Hoefling.	"	"	"	"	City.	Offal.	Lean.	Same as No. 3.
14	April 13.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Middling.	Same as No. 11.
15	April 14.	Michel.	"	"	"	"	Atascosa Co.	Corn and mast.	Fat.	Pen in city; no privy near; rats.
16	April 16.	Krisch.	"	"	"	"	Bexar Co.	Corn.	Fat.	Pen outside city; no privy; no rats.
17	April 16.	Jagge.	"	"	"	"	Bexar Co.	Prairie.	Middling.	Pigpen outside city; no privy; no rats.
18	April 16.	Arnold.	"	"	"	"	Atascosa Co.	Corn.	Fat.	Pigpen outside city; no privy; no rats.
19	April 16.	H. Wessenberg.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	Pigpen outside city; no privy; no rats.
20	April 16.	Heiliger.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	Pigpen in city; privy near; rats.
21	April 16.	Webber.	"	"	"	"	Bexar Co.	Corn.	Middling.	Pigpen in city; privy near; rats.
22	April 16.	Delagau.	"	"	"	"	Bexar Co.	Corn and slops.	Lean.	Pigpen outside city; no privy; no rats.
23	April 16.	Geo. Wessenberg.	"	"	"	"	Bexar Co.	Prairie.	Middling.	Pigpen outside city; no privy; no rats.
24	April 16.	Michel.	"	"	"	"	Atascosa Co.	Corn and mast.	Middling.	Same as No. 15.
25	April 18.	Michel.	"	"	"	"	Atascosa Co.	Corn and mast.	Middling.	Same as No. 15.
26	April 19.	Michel.	"	"	"	"	Atascosa Co.	Corn and mast.	Lean.	Same as No. 15.
27	April 22.	Gastang.	"	"	"	"	Bexar Co.	Corn.	Fat.	Brought from country day of killing, where it was fattened.
28	April 23.	A. Runke.	"	"	"	"	Bexar Co.	Offal, corn, and slops.	Middling.	Pen outside city; rats.
29	April 23.	Heisser.	"	"	"	"	Goliad Co.	Prairie; corn six weeks.	Fat.	Pen outside city; no rats.
30	April 23.	Mathews.	"	"	"	"	Goliad Co.	Mast.	Fat.	Pen inside city; rats.
31	April 23.	Schultz.	"	"	"	"	City.	Offal.	Lean.	Same as No. 15.
32	April 23.	Michel.	"	"	"	"	Atascosa Co.	Corn and mast.	Lean.	

33	April 23.	Michel.]	"	"	Atascosa Co.	Corn and mast.	Lean.	Same as No. 15.
34	April 23.	G. Wessenberg.	"	"	Bexar Co.	Prairie.	Lean.	Outside city; no rats.
35	April 23.	E. Runke.	"	"	Bexar Co.	Offal, etc.	Middling.	Outside city; rats.
36	April 23.	Webber.	"	"	City.	Offal, etc.	Lean.	Pen in city; privy near rats; six months old.
37	April 23.	Arnold.	"	"	Medina Co.	Milk, slops, etc.	Middling.	Pen outside city; hog brought from Co. day of killing.
38	April 23.	Spicer.	"	"	Atascosa Co.	Prairie, corn and offal (1 month).	Lean.	Pen in city; rats; kept one month in pen.
39	April 23.	Heiligman.	"	"	Atascosa Co.	Prairie.	Lean.	Pen outside city; no rats; kept 14 days in pen.
40	April 24.	Jagge.	"	"	City.	Slops, tripe, etc.	Lean.	Pen outside city; no rats.
41	April 25.	Michel.	"	"	Bexar.	Mast and corn.	Middling.	Pen inside city; rats; no privy.
42	April 26.	Michel.	"	"	Bexar Co.	Prairie.	Middling.	Pen inside city; rats; no privy.
43	April 27.	Hoefling.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; fed on corn and offal in pen over a month.
44	April 28.	Michel.	"	"	Atascosa Co.	Corn and mast.	Lean.	Pen inside city; rats; no privy; kept about one month.
45	April 28.	Webber.	"	"	City.	Offal and mast.	Middling.	Pen in city; privy near; rats.
46	April 29.	Michel.	"	"	Atascosa Co.	Corn and mast.	Lean.	Same as No. 44.
47	April 29.	Krish.	"	"	Bexar Co.	Mast.	Middling.	Pen outside city; no privy; no rats.
48	April 29.	Webber.	"	"	Bexar Co.	Prairie.	Lean.	Bought day of killing from the county.
49	April 30.	Hoefling.	"	"	Bexar Co.	Prairie.	Lean.	Same as No. 43.
50	April 30.	Gastling.	"	"	Bexar Co.	Offal and slops.	Middling.	Pen in city; rats.
51	April 30.	Heisser.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; no rats.
52	May 1.	Michel.	"	"	City.	Slops.	Fat.	Pen in city; rats.
53	April 30.	Mathews.	"	"	Bexar Co.	Prairie.	Fat.	Bought two weeks before killing.
54	April 30.	May 1.	"	"	Bexar Co.	Mast.	Fat.	Bought two weeks before killing.
55	April 30.	Schultz.	"	"	City.	Offal.	Middling.	Pen in city; rats.
56	April 30.	Jagge.	"	"	Bexar Co.	Offal.	Middling.	Pen outside city; no rats.
57	April 30.	Gastling.	"	"	City.	Slops and corn.	Middling.	Pen in city; rats.
58	April 30.	Runke.	"	"	Atascosa Co.	Prairie.	Middling.	Pen outside city; rats.
59	April 30.	Webber.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; rats.
60	April 30.	Ollos.	"	"	City.	Corn.	Fat.	Pen on slops two weeks; pen in city; rats; privy.
61	May 2.	Michel.	"	"	Bexar Co.	Prairie.	Fat.	Kept six months in city.
62	May 7.	Heisser.	"	"	Goliad Co.	Prairie.	Lean.	Bought a few days before killing.
63	May 7.	Arnold.	"	"	City.	Slops and corn.	Fat.	Pen outside city; no rats.
64	May 7.	Michel.	"	"	City.	Offal.	Fat.	Pen outside city; rats; one year old.
65	May 7.	Jagge.	"	"	City.	Offal.	Fat.	Pen inside city; rats.
66	May 7.	N. Runke.	"	"	Medina Co.	Prairie and corn.	Middling.	Pen inside city; rats.
67	May 7.	E. Runke.	"	"	Medina Co.	Prairie and corn.	Middling.	Pen outside city; no rats.
68	May 7.	Schultz.	"	"	Bexar Co.	Offal and corn.	Lean.	Pen outside city; no rats.
69	May 7.	Spicer.	"	"	City.	Offal and corn.	Lean.	Pen in city; rats; privy near; kept in pen six months.
70	May 7.	Judd.	"	"	City.	Offal and corn.	Fat.	Pen outside city; rats.
71	May 9.	Michel.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; rats.
72	May 10.	Michel.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; rats.
73	May 12.	Michel.	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city; rats.
74	May 14.	Henser.	"	"	Goliad Co.	Prairie.	Lean.	Pen outside city; rats.



## Record of Examination of Hogs for Trichinæ at San Antonio, Texas, from April to November, 1881 — Continued.

No.	Date of Killing.	Date of Examination.	Butcher.	Pectoral Muscles.	Diaphragm.	Abdominal Muscles.	Ham and Shoulder.	Locality.	Food.	Appearance.	Age. Remarks.
76	May 14.	May 15.	Michel.	No trich.	No trich.	No trich.	No trich.	Medina Co.	Corn.	Fat.	
77	May 14.	May 15.	Michel.	"	"	"	"	City.	Corn and slops.	Fat.	
78	May 14.	May 15.	M. Arnaud.	"	"	"	"	Atascosa Co.	Prairie.	Fat.	
79	May 14.	May 15.	Shultz.	"	"	"	"	Bexar Co.	Corn.	Fat.	
80	May 14.	May 15.	E. Runke.	"	"	"	"	City.	Ofal and corn.	Fat.	
81	May 14.	May 15.	Spicer.	"	"	"	"	Atascosa Co.	Prairie.	Fat.	
82	May 20.	May 21.	Leonard.	"	"	"	"	City.	Ofal and corn.	Fat.	
83	May 20.	May 21.	Hensler.	"	"	"	"	City.	Corn.	Fat.	
84	May 20.	May 21.	Heiligman.	"	"	"	"	Wilson Co.	Prairie.	Lean.	
85	May 20.	May 21.	E. Runke.	"	"	"	"	Atascosa Co.	Corn and ofal.	Lean.	Kept 3 months in pen.
86	May 21.	May 21.	Michel.	"	"	"	"	City.	Corn and ofal.	Lean.	
87	May 21.	May 22.	Shultz.	"	"	"	"	Bexar Co.	Corn and ofal.	Lean.	
88	May 21.	May 22.	Kunke.	"	"	"	"	City.	Ofal.	Lean.	6 months old.
89	May 21.	May 22.	Mathews.	"	"	"	"	Bexar Co.	Prairie.	Lean.	
90	May 21.	May 22.	Hensler.	"	"	"	"	Bexar Co.	Mast.	Lean.	
91	May 21.	May 22.	Krishe.	"	"	"	"	Bexar Co.	Prairie.	Lean.	
92	May 21.	May 22.	Jugge.	"	"	"	"	Bexar Co.	Prairie.	Lean.	
93	May 21.	May 22.	Spicer.	"	"	"	"	City.	Ofal.	Lean.	
94	May 24.	May 24.	Michel.	"	"	"	"	City.	Corn and ofal.	Fat.	Raised in pen.
95	May 28.	May 30.	Michel.	"	"	"	"	City.	Slops and corn.	Fat.	Raised in pen; 2 years old.
96	May 28.	May 30.	Michel.	"	"	"	"	City.	Slops and corn.	Fat.	Berkshire breed; raised in pen.
97	May 28.	May 30.	Runke.	"	"	"	"	City.	Slops and corn.	Fat.	Berkshire breed; raised in pen.
98	May 28.	May 30.	Shultz.	"	"	"	"	Medina Co.	Corn.	Fat.	
99	May 28.	May 30.	Shultz.	"	"	"	"	City.	Ofal.	Lean.	8 months.
100	May 28.	May 30.	Spicer.	"	"	"	"	City.	Ofal.	Lean.	2 years.
101	May 28.	May 30.	Jagge.	"	"	"	"	City.	Ofal.	Lean.	1 year.
102	May 28.	May 30.	H. Arnold.	"	"	"	"	City.	Prairie.	Lean.	18 months.
103	May 28.	May 30.	Hensler.	"	"	"	"	City.	Corn.	Fat.	10 months.
104	June 4.	June 5.	Shultz.	"	"	"	"	City.	Ofal.	Lean.	18 months.
105	June 4.	June 5.	Manger.	"	"	"	"	City.	Ofal.	Middling.	12 months.
106	June 4.	June 5.	Spicer.	"	"	"	"	City.	Ofal.	Middling.	8 months.
107	June 4.	June 5.	Shultz.	"	"	"	"	City.	Ofal.	Lean.	3 years.
108	June 4.	June 5.	Michel.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	10 months.
109	June 4.	June 5.	Heiligman.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
110	June 4.	June 5.	Kunke.	"	"	"	"	City.	Ofal.	Lean.	8 months.
111	June 4.	June 5.	H. Arnold.	"	"	"	"	Bexar Co.	Prairie.	Lean.	7 months.
112	June 4.	June 5.	Jagge.	"	"	"	"	City.	Ofal.	Lean.	1 year.
113	June 4.	June 5.	Michel.	"	"	"	"	City.	Ofal.	Lean.	7 months.
114	June 11.	June 12.	Michel.	"	"	"	"	City.	Ofal.	Lean.	1 year.

115	June 12.	Michel.	"	"	"	Bexar Co.	Prairie.	Lean.	10 months.
116	June 11.	Shultz.	"	"	"	City.	Offal.	Lean.	9 months.
117	June 11.	E. Runke.	"	"	"	Atascosa Co.	Prairie.	Lean.	9 months.
118	June 11.	Rudelsa.	"	"	"	City.	Offal.	Lean.	9 months.
119	June 11.	Jagge.	"	"	"	Bexar Co.	Prairie and offal.	Middling.	9 months. Kept 6 months in pen; rats; no privy; fed chiefly on slops and offal.
120	June 11.	Henser.	"	"	"	Bexar Co.	Prairie.	Lean.	18 months.
121	June 11.	A. Runke.	"	"	"	City.	Slops.	Fat.	10 months.
122	June 11.	Manger.	"	"	"	Bexar Co.	Prairie.	Lean.	Pen outside city.
123	June 11.	Heligman.	"	"	"	Bexar Co.	Prairie.	Lean.	6 months.
124	June 16.	Michel.	"	"	"	City.	Offal.	Lean.	1 year.
125	June 17.	Krishe.	"	"	"	Wilson Co.	Prairie.	Fat.	3 months.
126	June 18.	Henser.	"	"	"	Wilson Co.	Offal.	Lean.	2 years.
127	June 18.	Ludwig.	"	"	"	Wilson Co.	Offal.	Fat.	1 year.
128	June 18.	Gastrin.	"	"	"	Bexar Co.	Corn.	Middling.	2 years.
129	June 19.	Spicer.	"	"	"	City.	Prairie.	Lean.	1 year.
130	June 18.	Michel.	"	"	"	Atascosa Co.	Slops and offal.	Fat.	2 years.
131	June 18.	Michel.	"	"	"	City.	Slops and offal.	Fat.	2 years. Raised in pen, outskirts of city; rats; privy.
132	June 18.	Runke.	"	"	"	Wilson Co.	Slops and offal.	Fat.	10 months.
133	June 18.	Shultz.	"	"	"	City.	Offal and slops.	Fat.	18 months.
134	June 19.	H. Arnold.	"	"	"	Bexar Co.	Prairie.	Lean.	10 months.
135	June 25.	Shultz.	"	"	"	Wilson Co.	Offal.	Lean.	12 months.
136	June 26.	Gastrin.	"	"	"	City.	Offal.	Fat.	6 months.
137	June 26.	Michel.	"	"	"	Wilson Co.	Prairie.	Lean.	6 months.
138	June 26.	Michel.	"	"	"	Medina Co.	Prairie.	Middling.	18 months.
139	June 26.	Spicer.	"	"	"	City.	Offal.	Lean.	12 months.
140	June 26.	Heligman.	"	"	"	Bexar Co.	Prairie.	Middling.	12 months.
141	June 25.	Hoeffling.	"	"	"	Bexar Co.	Offal.	Lean.	9 months.
142	June 25.	Henser.	"	"	"	City.	Slops and corn.	Middling.	10 months.
143	June 25.	H. Arnold.	"	"	"	Bexar Co.	Prairie.	Lean.	9 months.
144	June 25.	Runke.	"	"	"	City.	Slops and corn.	Lean.	9 months.
145	June 25.	Jagge.	"	"	"	Bexar Co.	Prairie and offal.	Middling.	9 months.
146	July 2.	Schultz.	"	"	"	Wilson Co.	Corn.	Fat.	2 years old.
147	July 2.	Manger.	"	"	"	City.	Offal.	Lean.	1 year.
148	July 2.	Jagge.	"	"	"	City.	Offal.	Lean.	6 years.
149	July 2.	Hoeffling.	"	"	"	Bexar Co.	Prairie.	Lean.	9 months.
150	July 2.	Michel.	"	"	"	Atascosa Co.	Prairie.	Lean.	18 months.
151	July 2.	Henser.	"	"	"	Goliad Co.	Prairie.	Fat.	2 years.
152	July 9.	Shultz.	"	"	"	City.	Offal.	Lean.	1 year.
153	July 9.	Jud.	"	"	"	City.	Offal.	Fat.	6 months.
154	July 9.	Michel.	"	"	"	City.	Corn and offal.	Fat.	12 months.
155	July 9.	Hoeffling.	"	"	"	Bexar Co.	Prairie.	Lean.	10 months.
156	July 9.	Michel.	"	"	"	Atascosa Co.	Prairie.	Lean.	12 months.
157	July 9.	Henser.	"	"	"	Goliad Co.	Prairie.	Lean.	12 months.

*Record of Examination of Hogs for Trichine at San Antonio, Texas, from April to November, 1881 — Continued.*

No.	Date of Killing.	Date of Examination.	Butcher.	Pectoral Muscles.	Diaphragm.	Abdominal Muscles.	Ham and Shoulder.	Locality.	Food.	Appearance.	Age. Remarks.
158	July 9.	July 10.	Gastling.	No trich.	No trich.	No trich.	No trich.	City.	Slops.	Lean.	6 months.
159	July 9.	July 10.	Runkle.	"	"	"	"	City.	Offal.	Middling.	7 years.
160	July 9.	July 10.	Jagge.	"	"	"	"	Bexar Co.	Prairie and offal.	Middling.	From same litter and raised with No. 119.
161	July 16.	July 17.	Schultz.	"	"	"	"	City.	Offal.	Fat.	6 specimens examined.
162	July 16.	July 17.	Manger.	"	"	"	"	Bexar Co.	Prairie.	Middling.	2 years. Raised in pen.
163	July 16.	July 17.	Henser.	"	"	"	"	Goliad Co.	Prairie.	Middling.	2 years.
164	July 16.	July 17.	Jagge.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	1 year.
165	July 16.	July 17.	Jagge.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	1 year.
166	July 23.	July 24.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Lean.	14 years.
167	July 23.	July 24.	Michel.	"	"	"	"	Medina Co.	Corn.	Fat.	14 years.
168	July 23.	July 24.	Heiligman.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
169	July 23.	July 24.	F. Gastring.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year. } Same lot.
170	July 23.	July 24.	Jos. Gastring.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
171	July 23.	July 24.	Shultz.	"	"	"	"	City.	Offal.	Middling.	1 year. Raised in pen.
172	July 23.	July 24.	Shultz.	"	"	"	"	Bexar Co.	Corn and offal.	Middling.	2 years. Kept 4 months in pen.
173	July 23.	July 24.	E. Runke.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	8 months.
174	July 23.	July 24.	A. Runke.	"	"	"	"	City.	Offal and corn.	Fat.	8 months. Raised in pen.
175	July 23.	July 24.	Henser.	"	"	"	"	City.	Corn.	Fat.	1 year. Raised in pen.
176	July 30.	July 31.	Schultz.	"	"	"	"	City.	Slops.	Middling.	1 year. Raised in pen.
177	July 30.	July 31.	Schultz.	"	"	"	"	City.	Offal.	Middling.	10 months. Raised in pen.
178	July 30.	July 31.	Manger.	"	"	"	"	Bexar Co.	Prairie.	Lean.	10 months.
179	July 30.	July 31.	Arnald.	"	"	"	"	Atascosa Co.	Milk.	Fat.	15 months. Raised in pen; near dairy.
180	July 30.	July 31.	A. Runke.	"	"	"	"	Guadalupe Co.	Prairie.	Lean.	10 months.
181	July 30.	July 31.	Michel.	"	"	"	"	Wilson Co.	Corn.	Fat.	1 year.
182	July 30.	July 31.	Heiligman.	"	"	"	"	City.	Slops.	Lean.	1 year.
183	July 30.	July 31.	Henser.	"	"	"	"	Atascosa Co.	Corn.	Middling.	1 year.
184	Aug. 6.	Aug. 7.	Schultz.	"	"	"	"	City.	Offal.	Lean.	10 months.
185	Aug. 6.	Aug. 7.	Schultz.	"	"	"	"	Bexar Co.	Prairie.	Lean.	10 months.
186	Aug. 6.	Aug. 7.	Mathews.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
187	Aug. 6.	Aug. 7.	Mathews.	"	"	"	"	Bexar Co.	Prairie.	Middling.	1 year. Fed on offal in pen 2 months.
188	Aug. 6.	Aug. 7.	Arnald.	"	"	"	"	Atascosa Co.	Milk.	Fat.	15 months. From same lot as No. 179.
189	Aug. 6.	Aug. 7.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Lean.	Fed in pen on offal 10 days.
190	Aug. 6.	Aug. 7.	Michel.	"	"	"	"	City.	Slops.	Lean.	1 year.
191	Aug. 6.	Aug. 7.	F. Gastring.	"	"	"	"	Bexar Co.	Prairie.	Lean.	15 months.
192	Aug. 6.	Aug. 7.	Henser.	"	"	"	"	City.	Corn.	Fat.	6 months.
193	Aug. 6.	Aug. 7.	A. Runke.	"	"	"	"	Guadalupe Co.	Prairie.	Lean.	10 months. } Same lot as No. 180.
194	Aug. 6.	Aug. 7.	E. Runke.	"	"	"	"	Co.	Prairie.	Lean.	10 months.
195	Aug. 6.	Aug. 7.	Heiligman.	"	"	"	"	Comal Co.	Prairie.	Fat.	18 months.





*Record of Examination of Hogs for Trichina at San Antonio, Texas, from April to November, 1881 — Continued.*

No.	Date of Killing.	Date of Examination.	Butcher.	Pectoral Muscles.	Diaphragm.	Abdominal Muscles.	Ham and Shoulder.	Locality.	Food.	Appearance.	Age. Remarks.
247	Sept. 10.	Sept. 11.	E. Runke.	No trich.	No trich.	No trich.	No trich.	Guadalupe Co.	Prairie.	Lean.	2 years.
248	Sept. 10.	Sept. 11.	Heiligman.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
249	Sept. 10.	Sept. 11.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Lean.	1 year.
250	Sept. 10.	Sept. 11.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Lean.	1 year.
251	Sept. 10.	Sept. 11.	Michel.	"	"	"	"	Wilson Co.	Prairie.	Lean.	1 year.
252	Sept. 10.	Sept. 11.	Michel.	"	"	"	"	City.	Offal.	Lean.	6 months.
253	Sept. 10.	Sept. 11.	Wessenberg.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
254	Sept. 10.	Sept. 11.	Judd.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
255	Sept. 10.	Sept. 11.	Michel.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
256	Sept. 17.	Sept. 18.	Michel.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
257	Sept. 17.	Sept. 18.	Hoeffling.	"	"	"	"	Medina Co.	Offal.	Middling.	1 year.
258	Sept. 17.	Sept. 18.	Gastling.	"	"	"	"	City.	Corn and offal.	Middling.	Raised in pen.
259	Sept. 17.	Sept. 18.	A. Runke.	"	"	"	"	City.	Offal.	Lean.	9 months. Raised in pen.
260	Sept. 17.	Sept. 18.	Manger.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
261	Sept. 17.	Sept. 18.	Manger.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
262	Sept. 17.	Sept. 18.	Jos. Gastling.	"	"	"	"	Bexar Co.	Corn.	Fat.	2 years.
263	Sept. 17.	Sept. 18.	Heiligman.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	9 months.
264	Sept. 17.	Sept. 18.	Mathews.	"	"	"	"	Bexar Co.	Corn.	Fat.	1 year.
265	Sept. 17.	Sept. 18.	Shultz.	"	"	"	"	City.	Corn and offal.	Fat.	3 years.
266	Sept. 17.	Sept. 18.	Shultz.	"	"	"	"	Wilson Co.	Prairie.	Lean.	3 years.
267	Sept. 17.	Sept. 18.	Jagge.	"	"	"	"	Bexar Co.	Prairie.	Lean.	6 months.
268	Sept. 17.	Sept. 18.	Spicer.	"	"	"	"	City.	Offal.	Lean.	18 months.
269	Sept. 17.	Sept. 18.	Henser.	"	"	"	"	Bexar Co.	Corn.	Middling.	1 year.
270	Sept. 17.	Sept. 18.	Jos. Gastling.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
271	Sept. 17.	Sept. 18.	Michel.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	1 year.
272	Sept. 17.	Sept. 18.	Arnould.	"	"	"	"	Atascosa Co.	Offal.	Fat.	1 year.
273	Sept. 24.	Sept. 25.	Spicer.	"	"	"	"	City.	Milk and corn.	Lean.	8 months. Raised in pen.
274	Sept. 24.	Sept. 25.	Jud.	"	"	"	"	Bexar Co.	Prairie.	Lean.	1 year.
275	Sept. 24.	Sept. 25.	Mathews.	"	"	"	"	Bexar Co.	Prairie.	Lean.	18 months.
276	Sept. 24.	Sept. 25.	Mathews.	"	"	"	"	Bexar Co.	Prairie.	Lean.	9 months.
277	Sept. 24.	Sept. 25.	Shultz.	"	"	"	"	Bexar Co.	Prairie.	Middling.	18 months.
278	Sept. 24.	Sept. 25.	Henser.	"	"	"	"	Bexar Co.	Prairie.	Lean.	12 months.
279	Sept. 24.	Sept. 25.	Manger.	"	"	"	"	Bexar Co.	Corn.	Fat.	15 months.
280	Sept. 24.	Sept. 25.	Jos. Gastling.	"	"	"	"	City.	Offal.	Middling.	12 months.
281	Sept. 24.	Sept. 25.	Hoeffling.	"	"	"	"	City.	Offal.	Middling.	Raised in pen.
282	Sept. 24.	Sept. 25.	E. Runke.	"	"	"	"	Bexar Co.	Prairie.	Lean.	12 months.
283	Sept. 24.	Sept. 25.	Shultz.	"	"	"	"	Atascosa Co.	Prairie.	Lean.	8 months.
284	Sept. 24.	Sept. 25.	Michel.	"	"	"	"	Bexar Co.	Slops.	Middling.	2 years.
285	Oct. 15.	Oct. 16.	Spicer.	"	"	"	"	Bexar Co.	Slops.	Middling.	1 year.
286	Oct. 15.	Oct. 16.	Spicer.	"	"	"	"	Bexar Co.	Slops.	Middling.	8 months.





June 25th another hog from the same litter as the infected hog was killed by the same butcher, and its meat examined on the 26th. This second hog, born at the same time as the first, was also brought up with it, and though, of its meat, fifteen specimens were thoroughly examined under the microscope, by Dr. Myers and myself, no trichinæ could be found.

A third hog of the same litter, and brought up with the first two named, was killed July 9th, and submitted to examination July 10th. The same careful examination that was given the two others was given to this, but no trichinæ were discovered.

The second infected hog was killed by a different butcher on the 18th of June, and examined on the 19th. It was a fat, two-year old sow, and was raised in a pen on the outskirts of the city. It was fed on offal and slops. Rats frequented the place, and a privy was in the immediate vicinity. Numerous trichinæ, encysted and free, were found in every specimen of muscle from this hog that was examined, namely, from pectoral, diaphragm, abdominal, ham, and shoulder.

The flesh of both these hogs was sold in market, and doubtless eaten by the purchasers; but no instance of infection of the human being is known to have occurred from eating their flesh. Yet, heretofore, such cases have occurred in this vicinity, although rarely. Dr. F. Herff, the most prominent practitioner in this city, informs me that one or two cases of trichinæ in the human being have appeared in his practice.

It is fortunate, as shown by this investigation, and others similar, that so many exposed to the infection escaped. Doubtless this is due to the effect on the trichinæ of the heat of cooking.

The escape of men and women from infection from the cases of trichinæ embraced in this report does not, however, weaken my conviction of the necessity of a systematic inspection of the flesh of all hogs killed, in order that the community may be protected from the danger of such infection.

### XIII.

#### THE CONTAGIOUS DISEASES OF DOMESTIC ANIMALS.

BY DR. EZRA M. HUNT,

*Secretary of State Board of Health of New Jersey.*

THE degree to which the diseases of animals are now attracting public attention has many foundations of propriety and necessity. If it were only that their sufferings and their wants appeal to our sympathy, and have claims upon our care, that appeal ought to secure some intelligent attention to their ailments. But they have become more intimately associated with us in a scientific and practical sense by the revelations and advancements of modern science. Biology compels us to include all life, and all its limitations, in our studies. Physiology and pathology as applied to the whole animal world indicate that the old recognitions of a comparative anatomy were but feeble expressions of those laws of symmetry which, in similarities and dissimilarities, in health and in disease, make the comparative study in physiology and pathology of still broader import.

Professor Flowers, in his address at the opening of the anatomical section of the late Congress, speaks of the "great revolutionary wave which has changed the whole aspect of biological ideas borne onward mainly by the enormous advances in our knowledge of zoölogy, comparative anatomy, and embryology."

Comparative physiology was sure to become a prominent study so soon as we learned that the study of function is fully as important as that of structure.

Buckle, in his "History of Civilization," says: "The best physiologists distinctly recognize that the basis of their science must include not only the animals below man, but also the entire vegetable kingdom, and that without this commanding survey of the whole realm of organic nature we cannot possibly understand human physiology, still less general physiology."

It is inevitable that comparative pathology must embrace all the diseases of animal and vegetable life. Sir James Paget, in his address some months since on elemental pathology, traced the comparative diseases of plants and trees, and morbid growths thereupon, in a way that showed how in this sphere we have much to learn. Dr. Wilkes well says, "the comparison of disease in men and animals may throw much light upon its nature; and it is remarkable that so few persons have been stimulated to the work by considering the long controversy which has taken place as to the relation between vaccinia and variola or hydrophobia and rabies. A true human pathology should have its basis in comparative pathology. Here lies a

'mine of wealth but little worked.' It is evident that in all these directions there are demands for the closest study and comparison."

But to the disciples of prevention, and the health publicist, there are inducements and obligations additional to these. Many of the diseases which it is our duty to prevent are derived or derivable from animals.

The list furnished by Professor Law to the National Board of Health names ten contagia and twenty-two parasites common to man and animals, besides fifteen parasites causing enzootics in animals.

Dr. Charles Cameron, Chairman of the Health Section of the late English Social Congress, says: "Recent discoveries show the enormous importance of the study of comparative medicine and pathology. It is only by such knowledge that preventive medicine can be most rapidly and surely advanced."

There is not merely the incidental fact enlarged upon by Ernest Hart when he tabulates fifty typhoid epidemics, fourteen of scarlatina, and seven of diphtheria, as somehow having their origin through milk supply.

Tuberculous disease is now claimed to be transferred by milk from animals to man, as well as the foot and mouth disease so much dreaded in England. Forms of anthrax, and splenic fever, and erysipelas, and perhaps some forms of boil, carbuncle, and skin diseases, depend on specific conditions of diseased meat.

Some allegations have also been made as to ill effects from the flesh of so-called hog cholera disease, and as to lard made into butterine therefrom.

It becomes our duty to prevent diseases in the lower animals, if only to prevent their transfer to mankind. The prominence which the study of parasitic diseases has very properly assumed attaches to this study a vast importance.

Dr. Cobbold, the eminent helminthologist, has catalogued upwards of two hundred specimens in the Museum of the College of Surgeons, London, in order "to show every parasitic animal that can affect the human body, and a selection of the principal types of those that inhabit the lower animals, especially such species as are associated with man."

To these we are constantly having additions, as in the new nematoid discovered by Bastian in the case of the boy who was at first supposed to have died of typhoid fever on the training ship *Cornwall*.

So impressed have not only professional men but the public become with the liabilities to various diseases that may occur through the flesh or milk of animals, that there is still another view that presses itself upon our attention.

There is no class of ailments from which the individual is so helpless to defend himself, and hence governments are striving to find out the extent of such maladies, and the means for their limitation and extinction.

Already, as we are well aware, the subject comes up as a great commercial question, and as involving great economic considerations as to food supply.

No one can witness the rigid inspection now being had in England of all foreign cattle and sheep, and the interdiction which has so fallen upon



American swine, as almost to banish its live stock from foreign markets, and to affect the trade in hams and salted pork, without realizing that the question has assumed importance, which, alike in the interests of health and of trade, deserves the closest attention of all sanitarians.

Great Britain imports 5,250,000 hundredweight annually.

In the present paper we propose to refer to most of these various diseases with only brief allusions.

*Foot and mouth disease* has, fortunately, not planted itself upon American soil. In the cases alleged to have come from our ports, Dr. Lyman, the chief veterinarian of the Agricultural Department, has been able to show that they were not American cases, but two bulls and eight heifers sent from England. They were promptly quarantined, and no spread among our cattle occurred. Yet, because of the degree to which this disease, if imported, would affect our meat, and still more our milk supply, it is incumbent upon us to take all proper means to secure its exclusion.

*Contagious pleuro-pneumonia*, although occasioning great loss of stock and of milk supply, has not as yet been proven to cause any specific disease through the meat or milk. Yet the trend of present opinion (see Cameron, etc.) is to look with suspicion upon it, as well as to regard it as a threatening source of inferior meat supply. There are urgent reasons why it should be watched and studied by sanitarians, both in the interests of health and of trade. For it is to be remembered that whatever reduces the quality of meat, or adds to its scarcity, is at least indirectly the cause of ill-health, since the poorer classes suffer physically from the higher prices, and have to feed on inferior flesh.

*Splenic fever* and other forms of anthracoid disease are of great interest to us because they may be communicated by inoculation, or by the eaten meat, and also because the Texas cattle fever bears a suspicious relation thereto, so that it is called by some good authorities a splenic fever or anthracoid disease.

While the most fatal and pronounced form of splenic fever is more common among foreign cattle than with us, these allied forms are to be closely studied and guarded in the interests of public health. All cattle now coming from America are closely watched for Texas fever. Recently I saw some cases in the yards at Birkenhead, which were feared to be of this or some other splenic variety.

There is no contagion more dreaded than that of these anthracoid diseases.

In France the disease as it affects sheep causes a loss, we are told by Pasteur, of twenty millions of francs or four millions of dollars annually.

Our losses by the Texas cattle disease have been large enough to lead to close inquiry, and the production or sale of such meat comes immediately under the condemnation of the sanitarian.

Within the present month it has been my duty to exercise watchful oversight of a localized outbreak of anthrax. Ten cows, three horses, three sheep, one hog, and several pigs have died as if infused with a virulent poison, and post mortems have indicated the splenic character of the out-

break. The swine perished within forty-eight hours after having gotten a taste of one of the lungs, and a bull which had broken into the pasturage died in three days. A farmer who assisted in a post mortem, and whose hand had no abraded surface, had swelling of arm and other symptoms which required medical care.

The swine disease known as pneumo-enteritis, swine plague, or hog cholera, has prevailed in at least thirty of the States, and the losses by it have been enormous.

#### THE SWINE.

The Special Report, No. 12, of the United States Department of Agriculture, 1879, refers to a tabular statement for 1877 of the losses of farm animals, chiefly from infectious and contagious diseases. The amount is stated at \$16,653,428. About two thirds of this sum was occasioned by the loss of swine by diseases presumed to be of an infectious or contagious character.

This particular disease continues to prevail in many parts of the country, and is far more common than in Great Britain or on the continent of Europe. Yet Fleming in his "Veterinary Journal" for September, 1881, speaks of it as "an inoculable disease, due to a particular germ, which in Europe and America threatens to ultimately exterminate the porcine species."

Because it does not produce such a disease as trichinosis, its effects upon the quality of food supply must not be overlooked.

The immense losses not only affect the poorer classes by causing higher prices, which means a diminished supply of meat, but furnishes a great quantity of meat of inferior, if not of diseased, quality. There have been cases of sickness from pork that have not been caused by trichinæ. The new nematoid found in the boy who was thought to have died of trichinæ on board the ship *Cornwall* (see report of Mr. Powers and Dr. Bastian, Local Government Board, 1879) has been already alluded to.

Ballard and Klein have recently reported an acute specific disease produced by eating pork infected with a species of bacillus in two series of cases (see State Med. Sec., meeting Med. Congress, 1881), the pork being claimed to have come from America. The disease might be called a pneumo-enteritis, as both lesions were found.

Professor Tidy, chemist of London Hospital, in some recent researches as to poisoning from eating pork sausages, thinks he has shown an alkaloid body and some chemical changes to have caused the sickness. Meat of diseased animals putrefies more readily and shows a tendency to a septic condition which the juices of the stomach are not always able to arrest.

Cases of meat poisoning that are not specific in any known sense are multiplying.

There is very great temptation in the case of small animals, like swine, when a disease breaks out among them, to hasten them into the potted meat can, the sausage machine, or the salt pork barrel. Any disease so extensive in its ravages, and so deadly in its type, must be carefully studied by the sanitarian as a guardian of the public health.

To the disease known as trichinosis we need to turn especial attention,

because of its direful results, its real existence, and the interdiction it has caused to our own great pork trade in almost every foreign country.

It is not necessary here that we sift all the historical and political facts which have to do with this trade interruption. Enough is real to justify serious attention, and enough false or accepted on insufficient evidence to astonish us that countries which have long been the recognized producers of cases of the disease should all at once have seemed to assume that trichinosed pork is an American production. Neither is there need that we fully trace the disease and its results, since this has been so often and ably done, and because the monograph by our fellow member, the lamented Surgeon W. C. W. Glazier, of the Marine Hospital Service, has so fully presented it.

We think he and others show that its occurrence here, in proportion to the number of our people, and our immense number of swine, is not equal to that of other countries. This nematoid was first discovered in Guy's Hospital, London, in 1833, and up to 1836, inclusive, nine cases had been found among hospital patients in that city; one in Bristol, England, and six in Ireland. In 1843 the trichinæ was observed in Denmark, and not long after in Germany. It is to be remembered that all these cases, as also the monograph of Luckhart and the paper of Zenker, as well as most of the observations of Virchow, antedate the record of any fatal case in the United States.

The first series of American cases are those alluded to by Virchow as having occurred in Davenport, Iowa, in 1856, in a German family. The mother returned to Germany in 1861, and died in 1864 in a German hospital. In her breast, which had been extirpated for cancer, encapsulated trichinæ were found. Before this the disease had become well known in Great Britain and Europe, and perchance the German woman was a host of the cyst on her first arrival here.

The report of Dr. J. L. W. Thudicum on the parasitic diseases of quadrupeds used for food, in the report of the Medical Officer of the Privy Council, 1864, covers the history up to that time. The list of Dr. Glazier of trichinosis epidemics in Europe since 1860 (pp. 82-87), and that of cases in the United States, reaching to 1880 (p. 172), completes the record, and shows how great a portion of the aggregate has occurred in other countries. His list of epidemics in Europe since 1860 comprises "about 160 epidemics, with 3,044 cases, and 17 places where no number is given. Allowing, according to Meissner, three cases each for places where no number is given, the whole numbers will reach 3,095, with 231 deaths, making a total of about 150 epidemics, 3,800 cases, 281 deaths, and 700 cases and 50 deaths not in the list. See page 87, Glazier.

A similar record as to the United States up to 1880, inclusive, gives 26 localized epidemics with 77 cases (a few cases number not known) and 26 deaths. While neither reckoning shows absolutely the relative degree of the disease, yet it does indicate that we are to look abroad for its greatest prevalence. But, as it appears "that only one fourth of those eating the flesh from a trichinosed hog are affected with trichinosis," and, as Pa-



genstecher says, "five per cent. of the cadavers in Berlin hospital contain trichinæ," and, as the disease is well proven to exist here, we cannot be too diligent in preventing it from becoming as prevalent here as it is in foreign countries. All the more because of our immense production, and of the demands of home and foreign health. The last census gives the aggregate of swine at 37,396,621, which includes only those kept by persons having land.

I am aware that large statements come to us (such as one not long since from Lyons, in France, and another from Boston, in the United States), which would indicate a much greater prevalence of trichinosed pork than is generally supposed.

This might occur from the observer having lighted upon a special run of the disease.

But I have also learned that the observations of microscopists, like those of clinicians, are not always correct; that their experiments, like our experience, although honest, may have sources of error, and that the cautions given by Surgeon Sternberg on page 5 of his excellent preface to his "Translation of Magnin's Brochure on the Bacteria," are to be regarded as closely as what is seen under the microscope.

The French decrees of February last, the action of the English government, and that of some states on the Continent, led our own government to an investigation which needs to be more exact and extended, but which, nevertheless, shows that the prohibition of importation was not well advised.

While there is still a kind of restrictive legislation which is unwise, yet we believe there is more of a disposition to get at the precise facts in a more authentic way, and to regulate commerce on the basis thereof. In this connection I submit a brief extract from a debate in the House of Lords on May 16th of the present year, a summary in the "New York Times" of September 14, 1881, based on the testimony of Consul Mason, of Basle, to our government, and a communication from Dr. Lyman, Veterinarian of the United States Department of Agriculture of date October 29, 1881, in answer to certain questions I had asked.

(a) In the House of Lords, May 16th, of the present year, Lord Stanley, of Alderly, asked Her Majesty's government whether they would prohibit the importations (alluding to pork) of which a large proportion were infected with trichinæ and bacilli; also, of such oleomargarine or butterine as contained the grease of pigs suffering from the new disease of swine at Chicago, and the fat of horses infected with disease, or such as were adulterated with soapstone. The Marquis of Huntley said he could assure the noble lord that there was no established case of American hams being infected with trichinæ, and there had been one case only of infection by bacilli. See "Fleming's Veterinary Journal," June, 1881, p. 462.

Consul Mason writes from Basle that abundant and unmistakable evidence shows that the panic about American meats has begun to decline. From the first it was artificially created, mainly by such official action as the French decree in February prohibiting importation of American pork, and

a published document from the Minister of the Interior in Neuchâtel asserting that the microscope had shown more than half of American hams and canned meats to be infected. That canton takes most of its 150,000,000 francs of exports from this country in the form of meats, and the trade has been almost destroyed for the present, although no case of trichinosis has ever been reported there. But as consumers, who have taken no part in the scare, have found themselves suffering from advanced prices, they have begun to complain, and as the sales of domestic meats in the difficulty of discriminating have been affected, dealers who thought they saw "protection" in the scare have joined the demand for removal of the prohibition. The leading meat importer in Basle has for several years subjected all his meats, from whatever country, to microscopic examination by the official city inspector; the occasional pieces containing traces of defunct trichinæ were saved, and were experimentally fed to hogs, chickens, cats, and dogs, but at the end of six months no trace of disease could be found in the flesh of these animals. The "syndicate of lard and salted meats" of Bordeaux made an elaborate protest against the French decree, saying that in twenty-five years only a single case of the disease has occurred in France, and the character of that was disputed; that Germany has excluded only chopped meat for sausages; that there is no prohibition in Europe except in Italy, and perhaps in Spain; that no decrees can keep out American meats, although disguise may be forced; and that it is supreme folly to injure the people of France for the sake of an imaginary danger. The Swiss "*Journal de Genève*" remarks that the ministers in Paris, London, and Brussels have been compelled to acknowledge that not a case of trichinosis from use of American meats has ever been authoritatively shown to have occurred in Belgium, France, or England, and it ascribes the scare to the jealousy of European meat growers and the desire of speculators in America to break the pork market, saying that a single Chicago firm is reported to have cleared 30,000,000 francs in one year by a skillful combination. Mr. Mason thinks the foreign trade in salted meats can never be fully restored without establishing in this country a system of official inspection which shall carry with it the weight of State or Federal authority. German municipal experience, notably in Berlin, has shown that a capable inspector can examine several hundred pieces per day, and that young men of ordinary education and good eyesight could be trained in a fortnight, by a competent microscopist, to do this work, and that the cost need not exceed three cents per hog. Until this or some equivalent step is taken, the one per cent. of diseased hogs admitted to exist here will be a serious obstacle to the export trade in meats, for European meats are officially inspected, and to be able to say that American are not is to give opponents of our trade the power to keep up a prejudice. An official report in review of the whole subject is needed, showing by statistics the extent of the hog product in this country, the immunity of our people from disease, how many hogs die of cholera and transportation accidents, and what becomes of them, and the actual values of land and corn in the pork-growing States. It is often published, and is more or less believed, that the comparative cheapness of our meats abroad

is because the bad or questionable qualities are exported. This can be combatted by showing that the cost of growing the best quality here permits exporting it at the prices it bears abroad. Such a report should be published under an official seal, which is, of all things, the most authoritative with a European, and should be distributed abroad.

“DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C., *October 29, 1881.*

“E. M. HUNT, M. D., *Secretary, etc., State Board of Health, Trenton, N. J.*

“*My dear Doctor,*—Your letter of inquiry of the 22d inst. is duly received. I will answer your questions as fully as I am able to do so. You ask:—

“‘1. State the comparative number of cases of trichinæ that have been identified as to their origin—viz.: How many American, English, French, Continental?’

“If this refers, as I suppose it does, to disease in human beings, I am unable to answer.

“‘2. How many live hogs are claimed to have come from America with trichinæ?’

“From the annual report of the English Veterinary Department for 1879 I copy the following:—

“‘The slaughter of large numbers of American swine at the port of landing afforded opportunity of obtaining specimens of flesh for examination with the view to ascertain what proportion of the animals were infected with trichinæ. The inspectors of the Veterinary Department examined two hundred and seventy-nine separate portions of swine’s flesh which were sent from Liverpool, and detected living trichinæ in three specimens. . . . No doubt, therefore, existed as to the dangerous character of American pork, and a consultation on the subject took place with the medical officers of the Local Government Board. The matter was also discussed in the House of Commons; but it was not deemed expedient to prohibit the introduction of American pork into this country, for the reason that such a measure would have damaged the trade without producing any satisfactory results, besides which, trichinosis among swine is known to exist in Germany, and it probably exists in other exporting countries, so that nothing short of total prohibition of swine flesh in all forms from all sources would have been effectual. The possibility of our own swine being to some extent infected with trichinæ has been suggested; the result, however, of many examinations has, up to this time, been negative.’

“I do not know that Germany or France has even examined for this disease in *live* hogs.

“‘3. How much shipped pork has been identified with it?’

“To foreign countries, Germany reports each year some, if I remember rightly, three to four thousand ‘pieces’ of American *pork*—where they get them, what a piece is, or what percentage of pieces examined and found diseased I have never seen any statement of their saying. I do not know that they have made any publicly, neither do I know that other foreign countries have done any more than to say that they found, upon examination, that



trichinæ existed in American pork, as they had seen it arriving in their countries.

“4. Have Western hogs in any one section been more affected?”

“It has no such favorite locality that we know of, although this will be a good ground for future investigation.

“5. Are trichinæ found in the fat, as in cold tried lard?”

“I have until now thought not. Professor Taylor, of this department (microscopist), tells me that in the “Journal of the Microscopical Association” he has recently seen that they have been found in fat. I should rather see, than believe without so doing. A veterinarian of New England informed me on April 14th last that he had examined portions from 2,701 Western hogs, obtained in Boston, 154 of which he found infected, *i. e.*, one case to each 17 54-100 hogs examined. He tells me that he will make a statement to this Savannah meeting that he has examined portions of 8,773 Western animals, and has found one case to every 25 animals. You will see that there is a great difference between his first (April) examination and this one, and his result is so greatly different from the English examination of our hogs, above mentioned, and so much above any known percentage among animals of every other country, that I *can't* but entertain doubts of the value of his examination.”

While such facts are to be borne in mind, the gravity of the disease, its cosmopolitan character, and the interest alike of health, life, and trade, require that under the lead and authority of the United States Government there should be such testing of facts as will be fully reliable and not depend on single observers, and that some plan be devised to secure both to animals and mankind immunity from this direful invasion.

The latest and most graphic outline of the disease is given incidentally in a scientific address by the veteran naturalist, Richard Owen, who gave it the name trichinæ. It is worthy of transcription: “The finding of the wormlet within the cysticulæ in 1835,<sup>1</sup> and the more important discovery of Dr. Zenker, of Dresden, in 1860, of its causative relations to a direful disease, have demonstrated that the several groups of symptoms to which I have referred under the respective technical denominations applied to their groups, may, one and all, be due to the deglutition of trichinæ spiralis.”

It is thus all the more serious because the symptoms simulate so many diseases, such as dyspepsia, common diarrhœa, dysentery, peritonitis, pneumonia, rheumatism, gout, typhoid fever, and endocarditis. “The larvæ of this wormlet in the flesh of the animal it infested being introduced as food into the human stomach, finds in that warm cavity an environment of mucous nutriment in which it rapidly matures, acquires activities, and develops its generative organs and products. If permitted to pass into the intestinal canal, it there excludes its progeny, which also rapidly acquire their full size and procreative faculty. But the grave symptoms of their presence are due to the curious migratory instincts of the young trichinæ,

<sup>1</sup> *Proceedings of the Zoölogical Society of London*, February 24, 1855; also *Transactions*, *ibid.*, 4to, vol. i.

which impels them to make their escape by perforating the tunic of the intestines, in the course of which operation the majority find their way into the venous capillaries. Such as wriggle through the meshes of the vascular network bore their way through the serous tunic of the gut and pass into the abdominal cavity, whereupon the peritonitis are complicated with the enteritic symptoms. But the majority are carried to the right side of the heart, and thence by the pulmonary artery to the lungs. Treading then the capillaries continuous with the commencement of the pulmonary veins, the trichinæ are brought back to the heart. As many as may have burrowed into the vascular walls of the right or the left ventricle, or may have got into the cavity of the pericardium, give rise to the symptoms summed up in the terms of the article already cited.

Trichinæ, which may have strayed into the tissue of the lungs, or which may have wriggled through the pulmonic serous covering, and from the pleural cavity may have invaded the serous membrane on their way to the intercostal muscles, add the pleuritic and pulmonic to the pericarditic symptoms. The natural affinity or attraction of the trichinæ is to myonine or the muscular tissue. There their wanderings come to an end. They are conveyed so soon and so rapidly by branches of the carotids to the muscles of the larynx, that the trichinæ are there found most constantly and abundantly, but usually so vast is their number that they are carried to the voluntary muscles of the entire body. In the exceedingly delicate connective tissue of the ultimate bundles of the ultimate fibrils, the young trichinæ coil themselves up to their larval repose, exciting no other organic change than an overflow of plasma, which condenses with the contiguous cellulosity and becomes moulded into the shape of an elliptic case, in which may be seen under the microscopic compressorium one or more of the tiny worms disposed in two or more circular coils.

An ounce of hog's muscle has been found to contain 85,000 trichinæ, while Thudicum estimated 40,000,000 in the body of a German who died in the London Hospital, and Cobbold, who reviewed the calculation, thought this below the number. He calculated in the flesh of a hog, that had caused an epidemic in England, 80,000,000.

Thus far the record of cases in Germany and of endemics thereof has been ahead of that of any other country.

The number of cases recorded by Glazier for the United States, from 1864 to 1880, is seventy-eight, while post mortems have afforded proof of their existence many times.

We believe there is nothing to point to this disease as more prevalent in the United States than in other countries. Yet it is prevalent enough and its occurrence possible and serious enough to demand the closest attention of all those whose effort it is to prevent disease.

The immense swine production and pork traffic of this country, of course, makes the aggregate number of cases larger, and at the same time enforces the interest and the duty of leaving no measures that are expedient untried to limit or destroy the disease. Not because it is an American parasite, for Heller<sup>1</sup> says that trichinæ have been found in all countries where search has

<sup>1</sup> Zeimmsen, *Encyk.*, iii., p. 628.

been made for them, and Pagenstecher says, "They are cosmopolitan with man, hogs, rats, and mice."

As it is not like a disease spread through the air, and does not rapidly pass from one animal to another, save where there is a source of production, there are great encouragements for an attempt to eradicate the disease. There is some reason to believe that rats frequenting hog-pens are often its conveyancers, and that we need some "Pied Piper of Hamelin" to drive them all into the sea. Cobbold says infection must be due to the facilities for swallowing garbage, especially dead rats. It is an established fact of natural history, that hogs are not by nature filthy in their habits or in their choice of food. If mankind thrust upon them all sorts of improper food, all the indignation must not be projected against the brute. A treatise on the hygienic management of swine is in order, especially as they have become subjected to such invasions.

All serious diseases which are either directly transmissible to man, or which by the diseased or imperfect meat and milk they put on the market or by the actual loss of food supply they occasion, must attract the attention of all sanitarians.

And as our foreign trade is being so much affected, both in the interests of health and of commerce, we should join in consultation and advice with those who have to guard our commercial and national interests.

We may call it prejudice or retaliation, and to some extent correct the distorted views of some of our British and continental friends, but so long as there is a basis of truth it behooves us, both in our home and foreign interests, to do all that is intelligent and practicable in stamping out or limiting these diseases.

For this we have a few suggestions to make:—

I. There is need of accurate study into causes as well as into methods of limitation. Our government has done some good work in the way of investigation, and the present distinguished head of the Agricultural Department, Dr. Loring, is by profession, agricultural knowledge, and executive experience, well fitted to do more.

There are some veterinarians that are at work, but the number of these is small, and it is difficult to find enough others who are capable.

We feel that medical men and others of this Association should feel these investigations to be as worthy of their labor as those directed to some human diseases. The time has come when medical and sanitary experts should recognize the study of the comparative plagues as a part of their work, and devote the closest study thereto.

II. Some form of direct oversight should be exercised in every State over the communicable diseases of animals. There is no more economical outlay than that which guards our milk and meat supply. An authority in every State to oversee the work, and to circulate information among farmers and stock-raisers, to obtain knowledge through local township committees, supervisors, or health boards, of special outbreaks, and to secure from assessors exact statements each year of all deaths and known causes of deaths of animals, would be of essential service. Thus infected districts would



soon be singled out, and the diseases ere long eradicated. In Germany microscopical examination of pork has been made compulsory.

III. Public abattoirs and inspection thereat should be encouraged.

IV. All live stock sent out of the country should be inspected at the point of final shipment by a government veterinary inspector.

V. Pork packing and smoking establishments should guarantee their methods, and be subject to penalty if the meats furnished by them are proven to have caused disease. Trade-marks and brands are easily made, and severe penalties to producers for any meat that is proved to have caused sickness is one of the best precautions. It will then be the interest of large establishments to protect themselves by sampling lots with the microscope, and by other expert examinations.

VI. A system of inspection is desirable, but we do not wholly rely upon it, as being exceedingly expensive, and as not alone accomplishing as much as when conjoined with other methods.

VII. All wholesale lots of chopped meats or sausage, or of potted meats, should be certified by competent meat inspectors.

VIII. It should be known that thorough salting and cooking remove all risks from animal parasites. Virchow, in treating of this disease, expresses his regret that the old forms of curing and smoking have had so many substitutes.

IX. Careful inquiries should be made as to the presence of parasites in fats, and as to the fats of diseased meats, lest lard and oleomargarine, etc., may be so prepared as not to be subjected to proper heat, and our risks be increased in this direction.

In view, therefore, of the vast interests involved to health, not less than to commerce, we trust this Association will direct still more careful attention to the communicable diseases of animals, and seek to find their causes, and arrest their courses, since be it man or beast it is a common concern in a common welfare.

*United States Live Stock.*

States.	Working Oxen.	Milch Cows.	Other Cattle.	Sheep.	Swine.
Alabama . . . . .	75,534	271,443	404,213	521,267	1,252,462
Arizona . . . . .	984	9,156	34,843	112,107	3,819
Arkansas . . . . .	25,444	249,497	433,392	375,795	1,565,098
California . . . . .	2,288	210,078	451,941	5,644,341	603,339
Colorado . . . . .	8,179	28,770	315,989	994,844	7,656
Connecticut . . . . .	28,399	116,198	92,121	104,592	63,662
Dakota . . . . .	11,418	40,572	88,825	47,116	63,394
Delaware . . . . .	5,818	27,284	20,450	40,044	48,186
District Columbia . . . . .	4	1,292	271		1,132
Florida . . . . .	16,141	30,359	414,869	80,169	287,051
Georgia . . . . .	50,026	315,973	544,812	752,490	1,471,003
Idaho . . . . .	737	12,838	71,292	39,246	14,178
Illinois . . . . .	3,346	865,913	1,515,093	1,544,728	5,170,168
Indiana . . . . .	3,970	504,944	865,136	1,614,073	3,186,413
Iowa . . . . .	2,504	854,097	1,754,341	669,510	6,034,316
Kansas . . . . .	16,789	418,333	1,015,935	733,275	1,787,969
Kentucky . . . . .	36,076	301,882	494,743	1,678,515	2,225,225
Louisiana . . . . .	41,729	146,454	282,418	203,177	633,489
Maine . . . . .	43,049	150,845	140,527	944,856	74,269
Maryland . . . . .	22,246	122,907	117,387	306,960	335,408
Massachusetts . . . . .	14,571	150,505	96,045	109,796	80,123
Michigan . . . . .	39,493	384,573	467,060	3,065,533	964,071
Minnesota . . . . .					
Mississippi . . . . .					
Missouri . . . . .	9,020	661,405	1,410,487	2,193,006	4,573,123
Montana . . . . .	936	11,308	160,143	241,225	10,278
Nebraska . . . . .	7,234	161,609	613,129	285,935	1,241,724
Nevada . . . . .	765	13,319	158,137	193,894	9,080
New Hampshire . . . . .					
New Jersey . . . . .	2,022	152,078	69,786	237,368	219,069
New Mexico . . . . .					
New York . . . . .	39,633	1,437,855	852,283	2,718,093	751,916
North Carolina . . . . .	50,188	232,133	375,105	690,894	1,453,541
Ohio . . . . .					
Oregon . . . . .					
Pennsylvania . . . . .					
Rhode Island . . . . .					
South Carolina . . . . .					
Tennessee . . . . .	27,337	303,832	444,736	1,079,743	2,158,169
Texas . . . . .					
Utah . . . . .					
Vermont . . . . .					
Virginia . . . . .	54,709	243,061	388,414	823,776	956,451
Washington . . . . .					
West Virginia . . . . .					
Wisconsin . . . . .	28,762	478,374	622,005	1,921,047	1,128,239
Wyoming . . . . .					
	671,351	8,897,917	14,811,928	30,027,415	37,396,621

*Eating Cattle Summary.*

Oxen . . . . .	671,351
Milch Cows . . . . .	8,897,917
Other Cattle . . . . .	14,811,928
Sheep . . . . .	30,027,415
Swine . . . . .	37,396,621
	91,805,232

## XIV.

### MALARIA IN NEW ENGLAND.

By J. F. A. ADAMS, M. D.,

*Pittsfield, Mass.*

A YEAR ago, at the request of the State Board of Health, Lunacy, and Charity, of Massachusetts, the writer of this paper made an investigation of the recent appearance of intermittent fever in that State, the results of which have just been published in the supplementary report of the Board. The investigation involved, of necessity, an extension of the inquiry into the other New England States, especially Connecticut. In the present paper the results will be briefly summarized, and the bearings of the observed phenomena upon the malarial problem stated as succinctly as possible.

The following points will be considered in order :—

- 1st. The periods when malaria has been present in New England.
- 2d. The nature of the localities visited.
- 3d. The rate of progress of the malarial wave.
- 4th. The subsidence of typhoid fever coincident with the appearance of malaria.
- 5th. The bearings of the facts observed upon the ætiology of malaria.

#### I. THE PERIODS OF PREVALENCE.

To the present generation of New Englanders, malarial fevers of home origin have been, until quite recently, wholly unknown. The whole literature of the subject prior to the present epidemic is comprised in a monograph by Dr. Oliver Wendell Holmes, published in 1846. The malarial fevers have never been truly endemic in New England, but have been occasional visitants, taking the form of epidemics of a few years' duration. When that portion of the country was first settled fever and ague was one of the common diseases, being apparently incident to the clearing off of the forest. The accounts of it, which are very incomplete, and chiefly from non-medical sources, make no mention of it subsequent to the latter part of the seventeenth century, and from this time onward for a hundred years, viz., until the latter part of the eighteenth century, New England enjoyed complete immunity from this disease. In 1793, however, intermittent fever reappeared, and, together with remittent fever and epidemic dysentery, prevailed in certain localities in the western portion of Connecticut and Massachusetts until 1799, when it vanished, and did not again appear until 1828, except in a single locality, viz., Sheffield, Mass., where it seemed to have obtained a foot-hold, for outbreaks occurred three times during this interval



in the years 1806, 1810, and 1820. From 1828 to 1836 was the next period of general prevalence, the same portions of the country being affected as in the previous visitation. From 1836 to 1850 no cases occurred, so far as can be learned, in any portion of New England. But in the latter year, 1850, a few cases began to appear in a swampy locality near New Haven. From this time to 1864 cases continued to appear there and at several other points on the shore of Long Island Sound between New Haven and the boundary of New York. Having established itself upon this base, malaria began, in 1864, a northward invasion, following the rivers in the western half of Connecticut, reaching the Massachusetts line in 1877, and, in the next three years, penetrating almost to the northern border of that State. Since the beginning of this invasion malaria has not disappeared from any locality where it has once obtained a footing, so that it has now prevailed continuously on the southern shore of Connecticut for thirty-one years, in the centre of that State for ten years, and in Massachusetts for four years. In the localities where it first appeared in Connecticut, however, it is said that its influence appears to be on the wane.

No other New England State has yet been visited except Rhode Island, the first cases in that State having occurred near Providence in 1880. Massachusetts, east of the towns bordering the Connecticut River, remained, up to last winter, free from the malarial fevers, the cases being limited to the western half of the State, the great bulk of them being in the counties of Hampden and Hampshire, and most of the remainder in a few scattered localities in Berkshire. Of the cases reported in 1880, 1,344 occurred in Hampden County, 300 in Hampshire, and 287 in Berkshire. Only five cases were reported in Franklin County, so that the northern boundary of Hampshire County, thirty miles north of the boundary of Connecticut, may be stated as practically the northern limit of malaria in the Connecticut Valley. In Berkshire County no considerable number of cases has occurred in any one locality north of New Lenox, which is twenty-five miles from the Connecticut line. The places reporting the largest number of cases are in Hampden County, Springfield, West Springfield, Chicopee, and Holyoke, reporting respectively, 250, 200, 300, and 500 cases, so that three fifths of all the cases in the State occurred in these four contiguous cities—two on the east and two on the west bank of the Connecticut River. In the State of Connecticut a considerable number of deaths from malarial diseases are reported by Dr. Chamberlain, Secretary of the State Board of Health, and he notes an increasing severity of the periodical fevers and a tendency to malarial complication of various other diseases. Up to last winter the cases in Massachusetts were mild, and a single fatal case of congestive chill in West Springfield was the only case reported of death from undoubted malarial disease. No definite information has been gathered as to the present year; but the accounts received indicate a less prevalence of malarial diseases in Massachusetts than in 1880.

## 2. THE NATURE OF THE LOCALITIES VISITED.

These localities are found to be, with scarcely any exception, on the borders of rivers, or adjacent to swamps, ponds, or artificial reservoirs. The first cases in Connecticut are said, by Dr. Bronson, of New Haven, to have been at Beaver Ponds, a swampy place northwest of that city. In moving northward, the malarial army appears to have sent a detachment up each of the rivers, while scouting parties have been sent across the country, from pond to pond. In high and dry localities it has scarcely been seen, but along the shores of the Connecticut, Housatonic, and Quinnipiac rivers, and their branches, its influence has been profoundly felt. It has thus shown a decided affinity for water. But, even in these localities, there has been a great difference in the degree of intensity of the malarial poison, and the evidence from all sources agrees in indicating that it is not water but mud, which most powerfully influences its development. On the banks of rivers, the greatest number of cases have occurred where there are marshy shores, overflowed in spring and laid bare in summer, especially where low spots or obstructed ditches cause stagnant pools to form which are gradually dried up by the summer sun. Besides these localities, the places most fertile in malaria have been the reservoirs used for water power, which, in Massachusetts and Connecticut, are very numerous and extensive. These reservoirs, which are formed by the construction of a dam, whereby the area of a natural pond is greatly enlarged, are very shallow and only full after the spring freshets. During the summer they become drawn down so as to expose great tracts of oozy bottom, covered with rotting stumps and other vegetable matter. The greater the extent of the exposed surface, the greater, as a rule, has been the prevalence of malarial fevers; and seasons of drought and unusually low water have been found where these fevers have been most prevalent. Such were the summers of 1870, 1876, and 1880, which were characterized by an unusual prevalence and rapid spread of intermittent fever, in 1870 in New Haven and vicinity, in 1876 at and near Hartford, and in 1880 in portions of Massachusetts.

The relation of fever and ague to rivers and ponds is shown by the fact that in Massachusetts, of the eighteen cities and towns reporting more than half a dozen cases in 1880, eleven were on the Connecticut River, comprising all those bordering upon that river in the counties of Hampden and Hampshire, and the remaining six were in Berkshire County, adjacent to reservoirs or to low, swampy places on the shores of the Housatonic, besides one locality of similar nature on the shore of the Hoosick River.

The first place invaded on the Connecticut River was Springfield, in 1870; next, Holyoke, in 1875; and next, Agawam, in 1878. In 1879 cases first appeared in West Springfield, Chicopee, Northampton, Hadley, and Hatfield, and in 1880 in Longmeadow, South Hadley, and Easthampton. Five of these are on the east and six on the west bank of the river, and, outside of these river towns, which in 1870 reported 1,647 cases, only twenty-seven cases were reported in the whole of the remainder of the two counties of Hampden and Hampshire.

In the river towns the first cases always appeared on low ground near the river, or on tributary streams or ponds, and such places have since remained the foci of the largest number of cases.

In Berkshire County the first cases of intermittent fever appeared at New Marlborough in 1874, the next at Sheffield in 1877, and the next at New Lenox in 1878. In 1879 the disease appeared at Great Barrington, Lanesborough, and Cheshire, and in 1880 in Monterey, Otis, Stockbridge, Lee, West Stockbridge, Richmond, Pittsfield, and North Adams. The number of cases has been much smaller than in the valley of the Connecticut, and nearly all of them have occurred in six towns, namely, Sheffield, Great Barrington, New Lenox, New Marlborough, Lanesborough, and North Adams, where the number of cases in 1880 was eighty, sixty, fifty-four, twenty-six, and thirteen respectively. The nature of these six localities is as follows: At Sheffield the cases occurred near a reservoir which is drawn down in summer, and along the Housatonic River, which is here slow and circuitous, and stagnant pools, left by the spring overflow, slowly evaporate in the adjacent meadows; at New Marlborough, in the Konkapot Valley, where are also stagnant pools formed by the overflow of the river; at Great Barrington, near an artificial reservoir formed by damming the Housatonic River; at New Lenox, close to a reservoir similarly formed, which is so extensive and shallow as to expose a great surface of swampy land in summer, and of so small a capacity as to cause large daily fluctuations as to depth; at Lanesborough, on the border of the great Cheshire reservoir; and at North Adams, on swampy land near the Hoosick River.

### 3. THE RATE OF PROGRESS.

This is found not to have been a regular one from town to town, but the advance has been by a series of invasions, the first attacking a few places at long intervals, the next affecting certain intermediate ones, and the main army following and occupying the country between these first established outposts.

Thus, while previous to 1864 no cases of intermittent fever had occurred beyond five miles from Long Island Sound, suddenly, in 1864, a few cases appeared in Wethersfield, thirty miles north of the Sound, but it was not till 1872 that the next and stronger wave, advancing from town to town, reached Hartford. In 1870 a few mild cases first appeared in Springfield, Mass., thirty miles north of Wethersfield, and the same year the first cases occurred at New Milford, on the Housatonic River, thirty miles north of any place where they had appeared the previous year. In 1874 cases were first observed at New Marlborough, forty miles north of New Milford, the intermediate towns having up to that time escaped, while the adjoining town of Sheffield was not reached till 1877. The next place reached north of Sheffield was New Lenox, distant twenty miles, and the next Lanesborough, ten miles further north.

With the exception of these preliminary leaps the advance of the malarial influence has been at a much slower rate. It took two years for it to creep up the Quinnipiac River, from New Haven to Wallingford, a distance of



twelve miles. Four years later it reached Meriden, six miles further north, while the ten miles between that city and New Britain was spanned in a single year. The journey from New Haven to Hartford was accomplished in eight years, and the distance from the Sound to the Massachusetts line, which varies from fifty-five to sixty-five miles, was crossed in a period of twelve years. After the first general appearance of intermittent fever in Massachusetts, in 1877, it traveled in three years thirty miles northward, while a few scattering cases occurred as far as forty miles from the southern boundary.

The rate of progress may be roughly stated to be from two to thirty miles a year.

As a rule it has been found that the most rapid progress has been made in the hottest and driest years. At all places the cases in the first year have been few and mild, the disease gathering strength thereafter from year to year.

#### 4. THE SUBSIDENCE OF TYPHOID FEVER.

The characteristic fevers of New England have always been of the typhoid variety, that is to say, continued fevers, accompanied with a local lesion in the glands of the small intestine. These are characterized by a peculiar range of temperature and an eruption on the skin. They are generally of long duration, and attended with diarrhœa, and exhibit a high rate of mortality. An important factor in their production has been shown to be the vitiation of air and drinking water by animal matters in a state of decomposition—such as are apt to collect about dwelling-houses. Whether or not there is a general atmospheric cause, besides these local causes, has never been satisfactorily proved. But, during the past ten years, a marked diminution in the prevalence of typhoid fever has been observed. Physicians generally report these cases as milder, of shorter duration, and with less diarrhœal tendency. This is especially true of the localities which have become malarious.

In Connecticut, the number of deaths from typhoid fever fell off from 458 in 1869 to 252 in 1878, while the deaths from malarial diseases increased from 9 in 1869 to 143 in 1878. In Massachusetts, the population increased from 1870 to 1880 over 22 per cent.; yet the number of deaths from typhoid fever decreased from 1,333 in 1870 to 637, or less than half, in 1879. It rose again in 1880 to 882, two thirds the number in 1870, perhaps for the reason that the summer of that year was very hot and dry, such as is usually fruitful in typhoid fevers. Yet, in comparing the different counties, we find that in Berkshire and Hampshire, where malarial fevers were prevailing, the deaths from typhoid fever, instead of increasing, as in the rest of the State, had still further diminished. Whether or not there is any actual antagonism between these two forms of fever is a question of great interest. That it may be so, evidence is not wanting, in various parts of the United States. Professor Cabell, of Virginia, has published such evidence existing in his own State. But there is another point to be considered, which is, how far the local sanitary work which has been carried on

in New England during the past decade is to receive credit for the subsidence of typhoid fever. Such of us as have been actively engaged upon health boards have flattered ourselves that the fruits of our labors had become apparent. To find that this subsidence is due not to sanitary science but to malaria would be most mortifying.

#### 5. THE BEARING OF THE FACTS OBSERVED UPON THE ETIOLOGY OF MALARIA.

The facts observed in New England indicate an undoubted connection between malaria and swampy land, and in the gradual progress along river margins and from pond to pond, lend strength to the germ theory ; for the analogy is complete between this progress and the distribution of plants, where seeds are wafted by the winds, to fall, germinate, and mature, wherever the proper soil for their development is found.

The theory of Dr. Oldham that the periodical fevers are due wholly to the influence of chill upon constitutions enfeebled by prolonged and excessive heat, appears to be completely overthrown by these observations : First, because the temperature of New England has undergone no marked change, and those portions of Massachusetts and Connecticut where there is no malaria are no cooler than the portions where it exists ; and, second, because in those situations which have now become malarious, cases have been abundant as early as the month of April, immediately after the melting of the snow, and while the weather is yet uncomfortably cold. These investigations have not included any microscopic search for the malarial germ. This is a special branch of the subject, which now offers a tempting field for biological research. While Drs. Klebs and Tomasi Crudeli at Rome in 1879, and Dr. Sternberg at New Orleans in 1880, have done most valuable work in this direction, we cannot fail to perceive the force of Dr. Sternberg's suggestion, that, until the inoculation experiments which they performed upon rabbits are repeated upon the human subject, they cannot be deemed convincing.

No preventive measures to check the spread of malaria have yet been adopted in New England. The reservoirs, which evidently tend to promote its development, are so essential to the manufactures, upon which the prosperity of the State largely depends, that the question how far the public weal requires that they should be interfered with is a very delicate one. A case to be tried in Massachusetts next January is likely to develop many interesting facts in this direction. Suit has been brought against a manufacturing company for maintaining a nuisance, because their mill pond has become a focus of intermittent fever. Let us hope that the trial may add something of value to our knowledge of the subject, and that thus Law may become the handmaid of Science.

## XV.

### MALARIA IN CONNECTICUT.

By C. W. CHAMBERLAIN, M. D.,

*Secretary State Board of Health of Connecticut.*

WITHOUT taking time to enumerate the various theories that have been advanced from time to time regarding the causation of malaria, I will simply state that while the germ theory cannot as yet be considered proven, the experiments of Klebs and Crudeli having been rendered doubtful by those of Dr. Sternberg, under the auspices of the National Board of Health, it is apparently the only one that will explain the various phenomena of the disease in Connecticut. There are those who believe that every form and type has its specific malarial agent. There may, and must of course, be conditions favorable and unfavorable for the development of such a germ if it exists. These are better understood than its origin or source. Without stating these in detail, nearly all writers admit wet soil, marshy land, and decaying vegetable substances as essential factors in producing malarial diseases. The only one factor that is known as essential, by general consent, is stagnant water. The rational conclusion, then, is, that the surest means of prevention is by a thorough and systematic drainage for both surface and subsoil water. Many places where the surface is dry are loaded with subsoil moisture. When the ground water is set back and stagnant the conditions are as favorable for the production of malarial poison as in the case of surface water. Fairfield and New Milford, in this State, illustrate this principle. Since the completion of a system of drainage, malarial diseases, before rapidly increasing, have steadily and rapidly decreased, and in one of the places almost entirely disappeared. Other local conditions that induce the disease to become endemic will be considered in their proper connection.

Connecticut has long had a well deserved reputation as an unusually healthy State, nor has the recent invasion by malarial diseases greatly increased the sickness and death-rate in comparison with other States. When its proximity to New York and New Jersey, where malarial diseases had long been indigenous, is considered, its long exemption seems stranger than the outbreak of malaria. It occupies the southwest corner of New England, and presents a very diversified surface. The eastern and western portions are hilly and mountainous; in the east, continuations of the White Mountains, of granite formation; on the west, of the Green Mountains, of limestone formation, extend nearly to the coast. The highest peak in the State is Mount Brace, in Salisbury, 2,300 feet high. The eastern portion



of the State may be disregarded, as thus far there has been no malaria east of the Thames. For purposes of study the State may be divided into the coast towns, including all the towns bordering on the Sound not otherwise described, the New Haven region, and the river valleys, which are that of the Connecticut and its tributaries, of the Housatonic and its tributaries, including the Naugatuck, and of the Quinnipiac, although the latter is included to a greater or less extent in the New Haven region. Together with Mill and West rivers it drains what should have been the lower valley of the Connecticut.

The shore towns have generally low, sandy beaches, more or less of salt meadow and marshy land along shore, and level plains with rolling to hilly grounds to the north; occasionally the hills extend nearly to the coast.

I will commence with the New Haven region: For the earlier history I am indebted principally to the valuable article by Dr. Bronson, of New Haven. The following brief topographical sketch is from his paper; his authority is Professor Dana. The New Haven region extends twelve miles inland from Long Island Sound; has a width of about four miles at its southern part, and seven at its northern limit; it is bounded east by sandstone and trap ridges; on the west by Woodbridge Plateau and the Orange Hills; on the north by Mount Carmel range, eight hundred feet high in some places; near the western boundary is West Rock trap range, four to five hundred feet high, terminating precipitously. Three to four miles east runs the Quinnipiac sandstone ridge, dividing that river and Mill River, ending in a bold, isolated peak, called East Rock. This is trap rock, three hundred and eighty feet high. A little north of a line connecting West and East Rocks are two short trap ridges. On the eastern margin of this region is the broad valley of the Quinnipiac. This is a sluggish river but four and one half feet above sea level. The tide flows nine miles up its valley, flooding a large tract of low meadow more than a mile wide at the sea, narrower above. Pile driving showed the mud to be forty feet deep in some places. From one third of a mile to a mile west is the Mill River, rising in Cheshire. Near its mouth are many acres of salt meadow which the ebbing tide leaves bare, and two miles from the harbor it is a bright, clear stream, with clean margins. Within six miles the water has been dammed, and there are from this point six dams and ponds found in several places. Still farther west, in the middle of the New Haven region, is the Hamden Plain, a continuation of that on which the city of New Haven stands. It is a sandy plain of little elevation. West of the centre of this plain are Beaver Ponds, one and a half miles from south to north, one quarter mile wide, now more properly a swamp or morass, through which a small river or factory stream flows. On the western margin of the city of New Haven is West River, a sluggish stream; west is the low and sandy plain on which West Haven is situated; at the mouth of the river are large tracts of salt meadow and tide mud; north the soil is higher, but clayey and wet. On the western border of the New Haven region flows Cove River with a wide margin of salt marsh at its mouth. There are then four small streams, each with extensive salt meadows, which drain this region. There is good reason to believe, I

have learned, that this whole region is alluvial, the delta of the Connecticut, which, upon the upheaval of the trap ranges at Meriden and vicinity, broke through the heights at Middletown and formed its present channel. There was formerly a canal through New Haven, now occupied by the Consolidated Railroad. To a great extent this region is a sandy plain, with a warm, light soil and little organic matter. History shows that fever and ague have prevailed, at least occasionally, from the time of its first settlement. The disease disappeared in 1832. In October, 1850, Dr. Daggett reported the first case of domestic origin near Beaver Ponds. On the 2d of April, 1851, a regular tertian was reported, followed by sporadic cases until in 1853 it became quite common. In 1857-58 a remittent fever, with intense febrile symptoms, which was arrested by quinine, was reported. On Cove River a dam was built in 1860, flooding fifty acres. The stumps of trees were left to rot in the water with the usual turf and other growth. The first case in the south part of the New Haven region was the man who tended the saw-mill near this pond, living close by. He had let the water off to make repairs in the flume. The next year his family were attacked with ague. From this point it spread to all points of the compass. In 1864 there were seventy cases within a mile and a half of this pond. In 1865 it became more general. Those before attacked were again seized, and the successive occupants of the house near the pond and the immediate region have since continued to suffer. The extreme eastern part of West Haven escaped from 1866 to 1870. The cases decreased that year. There was an unparalleled drought, and the sickness increased and was still more prevalent in 1871. In continuation of this history of malaria in West Haven—or rather the town of Orange—Dr. Barnett thus writes: "I have noticed that from the time of our fall rains till late spring, most of our malarial cases are at the foot and along the edges of two hill ranges, which extend for some distance through this town. During the warm months malaria is chiefly in the neighborhood of pools and marshy ground. The prevalent forms are remittent, intermittent, typho-malarial, and many cases of dumb ague. Malarial diseases are increasing. During the present year, since January, I think seventy-five per cent. of the inhabitants of West Haven have been affected to a greater or less degree. No ages are exempt. I have had a case in an old man aged ninety-eight, and in a new-born babe. There was only one dam constructed before the outbreak of malarial diseases. Since then, however, the same stream has been dammed above the other, and dams have been constructed on two other streams in different locations, interfering with natural drainage. A trout pond has been sunk below the natural bed of a sluggish stream, and malarial troubles are now common in these localities. During the drought the marsh near the trout pond presented a parched crust on the surface, and when the temperature fell in the evening an offensive mist like a dense fog would arise."

To return to the history of the region in question: In 1861 the New Haven Water Company completed their reservoir for supplying New Haven with water from Mill River. They built a dam thirty-five feet high at Whitneyville, the new dam taking the place of an old one eight feet high. A

deep, narrow pond two miles long was formed, called Lake Whitney ; several acres, mostly at the upper end of the lake, covered with stumps, bushes, etc., were flowed, the high banks preventing much spreading elsewhere. In 1863 the first case occurred in Hamden of regular intermittent ; about the same time two cases occurred in a house three quarters of a mile west ; there was one more case that year. In 1865, which was a dry year, the first epidemic appeared. In 1867 the disease had extended to Mount Carmel, four miles west of the north end of the lake, passing through three manufacturing villages, each with one mill pond, some with two ; these had long remained at the same height. In 1869, a very dry year, fever and ague was more common than ever, and extended half a mile west of its former limits. During this year the water company raised their dam four feet, making it thirty-nine feet high ; fifty acres of swamp land were flooded, fed mainly by its water-shed. In 1870, as has been before stated, the drought was unprecedented, the water in the lake sank lower than ever before, and eighty acres or more, including the recently flooded swamp, was exposed to the torrid rays of the sun. In 1870, at Whitneyville, seventy-one cases occurred among twenty-five to thirty families. In a village above, all but two out of sixty-five factory hands had the shakes. In Hamden, in a population of 3,028, competent judges stated that 2,000 were attacked by ague in 1870. To supply the city with water another large reservoir was drawn down, to add to the evils, great enough before. In 1871 it was nearly as rife, and extended up the Northampton Railroad as far as Southington.

The disease first became epidemic to the north of Beaver Pond in 1865 ; in the next year it visited every house for a mile and a half north, and was about as general in other directions.

In the other portions of the New Haven region the manifestations were similar to those already described. With regard to the subsequent history of the disease in Hamden, Dr. Swift thus writes : " Malarial fevers have prevailed extensively here ; all ages, sexes, classes, and conditions of our population are attacked ; probably fifty-nine sixtieths ; typho-malarial, with brain and lung complications, double quotidian and even three chills in one day, or two in one day and three in the next. I have seen enlarged spleens by the score, brain, lung, liver, and, indeed, complicated affections of all organs of the body from malaria. We had but little malarial trouble in 1880 until about August, when a new railroad bed began to be worked. As was to be expected, nearly all the laborers, and many of the inhabitants, were prostrated by malaria." He describes a pond of seventy-five acres, which in 1868 was covered by a floating plant about one fourth inch in diameter, of a green color, with four to five roots one to one and a half lines long, — probably some variety of the charadæ. Other ponds along the stream are filling up with this aquatic vegetation. True typhoid or tuberculous disease of the lungs are never seen or but rarely.

#### NEW HAVEN.

The next case to those described was in 1864. It was endemic in the city — a few cases — until 1870, when there was an extensive outbreak, in-



volved a great portion of the entire city, all its maritime parts east of the Hartford Railroad, and some other portions. In 1871 it occupied all the territory that it had the previous year, and considerable territory that had then escaped. This greater prevalence was charged to the carrying out of a system of sewerage, street paving, etc.; but of this Dr. Bronson finds no evidence. In 1872 the disease was about as prevalent as in 1871, but apparently made little progress. The following table of mortality will show succinctly the relative frequency of malaria in New Haven since 1872:—

	Inter- mittent.	Ty- phoid.		Inter- mittent.	Ty- phoid.
1873 . . . . .	7	55	1877 . . . . .	20	13
1874 . . . . .	5	45	1878 . . . . .	14	14
1875 . . . . .	12	37	1879 . . . . .	22	16
1876 . . . . .	14	22	1880 . . . . .	6	15

The mortality in 1881 will probably exceed that of 1880. This is not an entirely exact criterion. The longer malarial diseases are endemic the greater the mortality in proportion to the number of cases. While for the past few years malarial diseases have not increased to any great extent the mortality has largely, the cases are more severe, and the powers of resistance are weakened. The second row of figures shows the mortality from typhoid, showing how marked an influence malarial diseases have exerted in decreasing the frequency of typhoid fever.

#### VALLEY OF THE QUINNIPIAC.

The Quinnipiac flows through a sandy, gravelly soil, with scarcely a swamp or marsh on its course until the salt marsh at its mouth, already described. Commencing with the manufacturing village of Quinnipiac on the borders of Wallingford, the dams are placed as thickly as the nature of the river will allow, along its whole course to its origin in the Southington hills, so that the water is set back from one dam to the other. The largest pond is at South Meriden or Hanover, where the river receives its largest tributary—Harbor Brook. The two ponds at Wallingford are of about the same size. There have been no changes since malarial diseases appeared that might induce it, and the region is remarkably dry. Indeed a large part of Wallingford is an arid, sandy plain. There is one large peat bog, notorious as the scene of the land-slide of the New York and New Haven Railroad Company's track. This is usually covered with water, but adjacent is a large, boggy swamp with stagnant pools. Harbor Brook is as extensively dammed as the river, and in addition receives about two thirds of the sewage of Meriden. To these the inhabitants of the villages below Meriden charge the causation of the fever and ague, which is nearly as prevalent throughout the valley of the Quinnipiac as in the New Haven region. It appears, however, a direct extension of the disease from that region. South of North Haven are many brickyards for two miles, with many shallow basins made by the removal of clay. West of the river there are several acres of

standing water and low wet land in North Haven which the tide does not reach. Malaria first appeared in 1866. Next year there were more cases about these brickyards, but in 1870 the disease spread up and down the river on both sides. Below the bridge in East Haven it spread; scarcely a family for five miles towards New Haven, and indeed scarcely an inmate of each house, escaped. On the east side it was not as general; on the high ground it was rarely seen.

All along the valley it spread through the villages. A large part of the population were attacked; scarce any on the plains escaped. It reappeared with increased severity in 1871, when it reached New Britain, just above the head waters of the river. A peculiarity of these diseases was first mentioned in 1871, not universal, but quite common. It reached its culminating point, then began to decline, and again kindled up afresh only to subside again. In East Haven but few cases occurred up to 1872. The first was in 1866. As elsewhere, the greatest prevalence was in 1871.

#### VALLEY OF THE CONNECTICUT.

The valley of the Connecticut is in this State broad and extensive until the narrows below Middletown are reached. For a few miles the banks are high and somewhat precipitous, resembling slightly the highlands of the Hudson. The valley soon becomes broad again, with clayey banks, which, except in the narrows, are characteristic along its course through this State. The current is constantly changing, and acres are transferred from one place to another. Large areas of low meadows are overflowed spring and fall, and coves and bayous are not infrequent. The Farmington, which is its principal tributary, has very low banks, and runs a very erratic course. It rises in the northern part of the State, runs south to Farmington, — about one fourth across the State, — doubles upon itself and runs north half way back to the border of the State, with an easterly bend, makes a deep southerly curve, then runs southeast until it reaches the Connecticut. Its banks are for the most part exceedingly low, and the meadows overflowed in spring and fall. At Tariffville it runs through a deep ravine, with wild and beautiful scenery. It is upon these bottom lands, of both these rivers, that malarial fevers are most prevalent, and first appear, as a rule. And here they are most persistent and oftenest recur.

There is no history of malarial fever in colonial times except in that part of the valley of the Connecticut north of this State. The only exception to this statement is as follows: I learn from Dr. Parsons, of Enfield, that malarial diseases prevailed there one hundred years ago, in 1781, or very near that date.

There were sporadic cases in the valley from 1851; East Windsor, 1857; Rocky Hill, Essex, and Glastonbury in 1861, Berlin, 1868.

There were sporadic cases in the valley of the Connecticut in 1851, when a case occurred in East Windsor; 1856 in Thompsonville; 1857 in Rocky Hill; 1861 in Essex and Glastonbury; 1864 in Wethersfield, until the commencement of the epidemic in 1872. Before this, however, there was extensive prevalence of the disease in Wallingford, one of the more southerly

towns, to which in 1865 the disease extended from North Haven in the Quinnipiac Valley. In 1866-7 it had become an epidemic in Enfield, and to a considerable extent before 1870. The origin here, unless from local causes, is obscure, as I find no account of any prevalence to the north before 1870, when it appeared in Springfield. In 1868 there were a few cases in Portland, but it did not become general until 1871-2, and spread from thence in both directions. It is a singular fact that malarial diseases appeared in Enfield in 1866-1870, and directly across the river in Suffield not until 1877 — eleven years later. The latter place is situated upon high, dry, well-drained soil, which, perhaps, is a sufficient reason. In Cromwell and Middletown, opposite Portland, the first cases appeared about the same time, but did not become general until two years later. In 1870 the disease first appeared in Collinsville and Meriden. But the most general outbreak was in the fall of 1871, and spring and summer of 1872; it then appeared in Hartford and seven or eight other towns nearly simultaneously. Its appearance in the different towns shows a gradual extension from certain points that acted as foci; yet there has been no uniform rate of progression, but the same general influences seem to obtain in its successive advances. Some ten towns were added in 1875, including the valley of the Farmington; six in 1878, while some of the remoter towns from the river banks, and parts of towns, were not invaded until 1879.

From this time the spread has been regular as to territory, but irregular as to time and method of invasion. In 1850 there were also a few sporadic cases in East Windsor. As the disease spread from several points, it is a little difficult to calculate its rate of progress. From Hartford to Bloomfield (six miles) it took three years; from Enfield to East Windsor, same data.

Intermittent fever became epidemic in several towns of the Connecticut Valley in 1871-72, as well as in Hartford; for instance, in Berlin and East Hartford.

It appeared in East Hartford, opposite to Hartford, on the other side of the river, in an epidemic form simultaneously, and was quite prevalent until 1876, when there was an extensive epidemic, in which seventy-two per cent. of the population were affected with a severe type of intermittent fever. The cases were nearly all of the tertian type, a few quotidian, and less typho-malarial. The only possible cause, except that it is largely built upon low meadows, overflowed to a great extent twice a year, and with a peculiar chill air, even in summer, as you go down to them from higher ground, is a large sand-bar, containing thirty acres or more, uncovered at low water, which catches the floating vegetable debris of the river, where malaria continues very prevalent.

#### CONCLUSIONS.

Intermittent fever existed in the early settlement of the State in one town in the eastern part, Pomfret, where malaria has not yet reappeared, which otherwise occupies the same limits as in colonial times, along the shore as far east as New London, in several towns in Fairfield County, and in the valley of the Housatonic. In 1671 it appeared in New Haven, and the towns along the Sound to New London. The people of the other towns



were attacked by ague later, some time in the seventeenth century. In Litchfield, in 1725, there was a prevalence of malaria in the neighborhood of a dam on the Bantam River. This was removed in 1730, when malarial diseases disappeared. Dr. Holmes mentions five places — Litchfield, New Milford, New Haven, Pomfret, and Greenwich — where intermittent fever was supposed to exist previous to 1836. In the last ten years of the eighteenth century intermittent fevers prevailed in many places in the Housatonic Valley. In 1811 it prevailed in Greenwich, and in Salisbury until 1818-19, and in 1825 it prevailed along a belt five miles wide from New York to the Housatonic River, which, however, it did not cross. This remained until 1832, when it reappeared in Salisbury, lasting until 1835. There were cases in New London County from 1837 to 1843. I omitted to state its presence in Enfield in 1780. Sporadic cases appeared until 1850,<sup>1</sup> when it appeared near Beaver Ponds, in the northwestern portion of the city; then sporadic cases until the epidemic of 1864, near the saw-mill pond in West Haven. From that time its spread was rapid and extensive over the New Haven region, reaching Wallingford in 1865, by extending across the valley of the Quinnipiac, thus gaining access to the Connecticut Valley. In 1866, singularly enough, it appeared at the extreme northern end of the State, in a border town — Enfield — and, spreading from these two points, completed the invasion of the valley in 1878 — the years of most extensive diffusion, 1872 and 1875.<sup>2</sup> It crept along the Sound, starting from the epidemic near the New York line in 1853-1855, reaching Bridgeport in 1861-62, and thence extending eastward gradually, as it took two years to reach the next town, Stratford, distant only four miles.

It now occupies about three fourths of the State, but the eastern limit in colonial times has not yet been passed. With few exceptions my correspondents unite in the opinion that local causes are insufficient to account for its causation, that is, for its first appearance. Nor have I been able to find any causes or sets of causes that uniformly produce malaria, nor any unsanitary conditions that have generally been supposed to be productive of malaria that do not exist to the same, or greater extent in other portions of the State where no malaria has ever appeared during any period of the history of the State. The only general law that I have been able to discover is, that it follows rivers and streams, even to their springs, and is less influenced by the Sound, as its rate of spread seems to be somewhat less rapid, and its severity, persistence, and recurrence much less. That while it occurs on hills remote from rivers and low lands, there are fewer cases in such locations, and they are the last reached. Thus, although nearly all the hill towns in the western part of the State are affected, there are, with few exceptions, but few cases, in some only three or four. In these epidemics of

<sup>1</sup> There were sporadic cases in Guilford from 1852 to 1878. There were sporadic cases in Sharon from 1856 until it became epidemic.

<sup>2</sup> There were sporadic cases in Essex and Glastonbury in 1861. In 1876 it appeared in Salisbury, where it existed from 1811 to 1818, and 1832 to 1835. Apparently from Ashley Falls, Mass., eight miles above, from September, 1877, to the present time, not a house on the Housatonic River from Ashley Falls to the Sound, has escaped. It is less prevalent in the hill towns.

typho-malaria, high lands, near marshes and streams, often suffer more than low lands. The history of malaria proves this to be true.

In fact there have generally been cases of malaria before the alleged causes have existed. That extensive disturbances of the soil are favorable to the production of an endemic condition of malarial diseases, appears to be indisputable. And that ponds exert a like influence under certain conditions, is alike true. But the change of the level of the subsoil water, and rendering that stagnant, seem to be as effectual as any of the local influences in ordinary malaria.

As before intimated, it is very generally true, that people living on a hill-side, near a marsh, or on a high bluff or cliff, are often more affected than those in the valley, or upon low ground. The limit, however, seems to be about six hundred feet; rarely, if ever, above eight hundred. The malarial influence, whatever it may be, apparently rises and is conveyed by the winds, even to sandy plains and to ships near the coast.

In many places the disease has shown a marked periodicity in its recurrence, the period being about twenty years. This is true quite often.

THE INFLUENCE OF PONDS AND DAMS, THE FLOODING OF LANDS AND UPEHEAVAL OF EARTH, AS IN THE CONSTRUCTION OF RAILROADS.

At first glance it would seem that ponds and dams, and the flooding of lands, had exerted a very important and general influence. Especially does this seem true of the history of malaria in the New Haven region, and the history of many towns, as reported. It must be granted that there have been accessory causes in producing epidemics, and in inducing malarial diseases to become endemic, but there is ample evidence to show that malarial diseases were almost, if not invariably, present before, and the cases are infrequent, if any exist, where, in the region about, there had not been cases of malaria prior to the supposed original cause. The special cases are detailed in the history of each town, and I will tabulate them for ready reference. In all cases where decaying vegetation was exposed and swampy lands flooded largely, there was a marked exacerbation, but no malaria followed unless it had previously existed or reached the region by extension from some other infected region. Near Seymour there has recently been constructed a large dam on the Housatonic, setting the water back a large distance, yet there has been no marked increase of intermittent fever [two years after its construction, in 1877, when the water was very low, malaria first appeared in Huntington, near by, but the disease was extending in that direction], nor as much as near a wet clay cutting on the New York and New England Railroad. The Quinnipiac was dammed from near its source, and many of its tributaries, so that the water is set back from one dam to the other, but no intermittent until it spread from the New Haven region. To be sure, there are no swamps. Yet swampy land is flooded, and exposed freely in other parts of the State, and no ague follows. The cases used as illustrations of this point, are the dams at New Milford and Litchfield in colonial times, and several minor cases, the history of the region around New Haven, and several similar instances in the history of

special towns. From the whole history of the case, it must be granted, I think, that there is no evidence that these influences caused malaria *de novo*, but they have influenced its severity, its tendency to become epidemic, and the frequency of its recurrence.

Dams, indeed, seem a prevention of malaria. Often when lands that are fully submerged are drained, malaria appears ; and when they are washed away ; but when the dams are restored and the land flooded, malaria often disappears.

#### INFLUENCE UPON OTHER DISEASES.

Damp bottom lands, subject to annual overflow, are fruitful in the generation of malarial poison. Experience in this State shows that such lands are exceedingly influential in causing malarial diseases to become endemic when once introduced, especially if they are uneven so that water lingers in spots. Numberless instances of this have occurred in the valleys of the Farmington, Connecticut, Housatonic, and other rivers, but similar lands in the eastern part of the State have not yet succeeded in producing malaria.

In many instances the first intimation of the approach of intermittent fever was in the behavior of other diseases. They all assumed a more or less periodic character, and quinine, together with other anti-periodics, exerted a much more decidedly beneficial appearance. Upon the establishment of an epidemic, a still more marked influence was exerted, and malarial neuralgias, broncho-pneumonia, diarrhœa, dysentery, and so on through the list, were common. The most destructive influence, perhaps, was exerted upon typhoid fever, the indigenous fever of the region, and a new type, typho-malarial fever, was developed, the distinctive features of which will be mentioned directly. Of late very many physicians describe what they call a malarial fever, lasting from eight to ten days to three weeks, rarely fatal, attended with great prostration, profuse perspiration, no diarrhœa ; if long continued usually bronchial complications develop ; usually delirium in the severe cases, often maniacal, with murderous impulse, or in milder cases a disposition, usually under control, to injure family, friends, and attendants. The intermissions are irregular, nor is it at all of a remittent type. The exacerbations of fever and chills are very irregular, at any and all times of the day. Vomiting is not infrequent. In this connection I might remark that the influence of malarial diseases has been very unfavorable upon the production of insanity and puerperal mania. Many cases are due entirely to malaria. Its influence upon alcoholism is about the same, as laboring men are attacked by a disease that destroys their appetite and digestion. For the time alcoholics are resorted to to tide them along and enable them to work. Thus the habit is formed, in many instances so strong, that it cannot afterwards be overcome.

The general testimony is to the effect that malarial diseases have greatly diminished the frequency of typhoid fever ; indeed, in twenty towns the doctors report that they have either not seen a case of pure typhoid, or but few, since malarial diseases prevailed extensively. The following table shows the mortality from the two diseases for the last twelve years :—



	Typhoid.	Malarial.		Typhoid.	Malarial.
1869 . . . . .	458	9	1875 . . . . .	449	21
1870 . . . . .	427	15	1876 . . . . .	327	22
1871 . . . . .	352	19	1877 . . . . .	321	73
1872 . . . . .	506	29	1878 . . . . .	352	143
1873 . . . . .	430	30	1879 . . . . .	159	198
1874 . . . . .	370	38	1880 . . . . .	252	265

Typhoid reached its maximum in 1872, its minimum in 1879; malarial diseases their maximum in 1880, minimum in 1869. Previous to this they figure on an average about a dozen cases each year for many years. The rapid increase in the last three years is noticeable; more than three times as many deaths are recorded. But with reference to typhoid fever a check in its decrease is noted. There was a marked increase in 1880, and returns indicate a still greater increase in 1881. As in Hartford so in many other places — Norwalk, for example. Typhoid is reported as more frequent than malarial in New Haven, and in other places they exist side by side.

I have been unable to ascertain any uniform influence on consumption. In some towns it was infrequent as typhoid; in more increased, while in the large majority uninfluenced. As the mortality and percentage to other known causes has not changed to any extent, it is safe to say that no effort has been in general exerted upon consumption by malarial diseases, even when most decidedly epidemic. Locally, it has been influenced in both directions. Cerebro-spinal meningitis, heretofore known only as an unusual epidemic, has become endemic over the greater part of the malarial regions. In several towns for a series of years the deaths have been the same as from malarial diseases. Pelvic derangements in women, flooding after labor, prolonged labor, and a long debility after, as well as puerperal mania, are products of malarial poisoning.

#### TYPHO-MALARIA FEVER.

This has prevailed extensively over the malarial region, often epidemic, and usually clearly marked in its characteristics. The malarial fevers are not contagious. There is no evidence that typho-malarial is conveyed by the stools or other excretions of the patient, cases appearing too soon for contagious influence in the same family or neighborhood. The diarrhœa, not always present, is not that of typhoid; the eruption, when present, differs; the typical temperature and duration vary. Its access is more sudden and sharp, commencing with a chill. It sometimes shows a weekly periodicity, marked by a lower than average fall of temperature, or a chill or profuse perspiration. Its course is from four to eight weeks, sometimes ending with tertian ague. Unlike typhoid, the patient seldom fattens up and appears healthier a year after. The temperature is very variable, running very high. Oftentimes in regular typhoid the temperature would indicate a fatal result. There is usually a period of fever once or twice in the day, more

often in the middle of the afternoon and about eleven in the morning. There is always a more or less bronzed hue, sometimes very jaundiced. Nausea and vomiting are early symptoms, sometimes epigastric tenderness, tympanitis not as pronounced. The rose-colored ventricular spots are seldom seen, but the sudaminous eruption, often not until the second week, is very frequent. This was specially marked in the last epidemic I had cognizance of. There were a hundred cases prostrated within ten days or a fortnight with malarial fevers, from fifteen to twenty typhoid-malarial, with seven fatal. The eruption of small watery pimples was exceedingly well marked, and some cases covered the body from head to foot.

As to hemorrhage, epistaxis is rarely if ever an initial symptom, intestinal hemorrhage sometimes present, as well as a purpuric tendency, ecchymotic patches, bleeding at gums, etc.

Bronchitis and respiratory complications are more marked, and catarrhal pneumonia sometimes succeeds.

The convalescence is very tedious and protracted, and relapses easily induced, and indeed often follow without any special cause apparent.

While I deprecate the use of the term malarial to cover any obscure case, there is no doubt but that in Connecticut all diseases are influenced by the presence of an epidemic of malaria. In this presentation, however, I have not considered the presence of such cases as proof of malaria. Unless there have been cases of genuine intermittent, remittent, and typho-malarial fevers, I have not considered malaria present. One frank, clear type of the disease, however, is enough.

Thus we see, since the early settlement of the State, there is scarcely a year in which there were not a few sporadic cases. The lower valley of the Housatonic and the southwestern shore towns were scarcely free or entirely free from malaria, that is, it never entirely disappeared from some portions of that region. It is true that there were recurrent epidemic periods, and in these years of unusual prevalence, and while local causes influenced greatly the severity, continuance, and recurrence, some general influence seems to determine the time when it becomes epidemic.

## XVI.

### OBSERVATIONS ON THE POTOMAC MARSHES AT WASHINGTON, D. C.

By ALEX. Y. P. GARNETT, M. D.,

*Washington, D. C.*

A TRUE conception of the vast and important subject of human sanitation necessarily leads us back to the consideration of those primal laws of nature which establish the relations of man to his natural surroundings, affecting his physical being through the agency of recognized physiological, chemical, and moral forces, either in the maintenance of a harmonious performance of all the vital functions of the animal economy, or militating with these, in the disturbance of the human machinery and the consequent production of disease. As in the study of the universe a correct knowledge of the laws controlling natural phenomena and the relations of celestial bodies to each other constitutes the basis of all intelligent investigation, so with man in his physical surroundings it behooves us to familiarize ourselves with those natural laws and agencies which hold him in relation to his environments and which directly affect the varied and complex phenomena of his health.

It would be entirely beyond the limits or pretensions of this paper, as well as an impossibility, to enter upon a comprehensive discussion of so wide a subject, or even to embrace in so circumscribed a field the innumerable and potential agencies which affect the health of individuals, and which may be considered legitimate objects for our consideration; nor is it proposed to include many of the most wide-spread and active causes which concern the public health, and with which the members of this body are called upon specially to deal. The particular subject to which your attention is invited, as the title of the paper discloses, is the supposed malarial influences of the marshy district of the Potomac immediately contiguous to Washington City. The nature, *modus operandi*, and pathological capabilities of the so-called marsh miasm upon the human system, will claim our notice further on. Contemporaneous with the location of our National Capital on the banks of the Potomac, we are told that the sanitary probabilities and possibilities of its surroundings became the subject of anxious consideration by its projectors, naturally apprehensive of those deleterious influences which it was believed emanated from the marshy districts found along the borders of our fresh-water rivers, capable of generating fevers, and recognizing the future possibility of such paludal formations, they were by no means unanimous or hasty in determining the final selection of its present site. Whilst from the date of its formation to the present time, Washington, like most



cities located upon fresh-water rivers, and in the immediate vicinity of marshy districts, has been subject to the so-called malarial influences producing fevers of various types, it is well known that such morbid agencies have been comparatively feeble in their pathogenic results as manifested in mild types of intermittent and remittent fevers, restricted in their active development more particularly to those portions of the city exposed to the marshy regions, and contiguous to areas of damp, undrained localities. It is perhaps due in some measure to the mild character of the fevers supposed to arise from these sources that the citizens of Washington have for so long a period neglected to adopt some active and efficient means to remedy the evil, contenting themselves with the hope and belief that Congress would some day become sufficiently impressed with so important a subject as the health of the National Capital as to make it a matter of national concern and accomplishment. Whilst there has existed for a long period a large area of marsh along the southern border of the river opposite the city, as well as considerable deposits of a similar character against its northern bank, immediately adjacent to the city, it was not until after the construction of the Long Bridge in 1808, necessitating, according to the plan adopted, the damming up of two thirds of the river, obstructing its channel, and otherwise affecting its natural outlet, that this paludal area has been rapidly augmenting, embracing at present several hundred acres of space, almost obliterating the north channel and destroying its usefulness for purposes of navigation for vessels of the lightest draft. In contemplating this prolific and acknowledged source of disease, directly affecting the health of the National Capital, and indirectly connected with the material and personal interests of the whole country, the question is very naturally suggested, why has this been permitted to exist so long a time? Why, with so many examples before us of the disastrous consequences of neglect, inaction, and disregard of obvious sanitary requirements, we have supinely drifted along passive and willing victims to the chances of disease or health? The answer, to my mind, is found in the absence of organized effort on the part of medical men. The failure of our professional men, who are the legitimate custodians of public as well as private health, to realize and appreciate the preëminent importance of this subject by organizing Boards of Health, and selecting for such work not only scientific, active, and experienced laborers in special subjects, but those who can be impressed with a full sense of the responsibility and comprehensive duty which attach to such organizations. Comparatively a short period has elapsed, as you are aware, since this subject of public sanitation has forced itself upon the attention of the profession and the public by demonstrating its tremendous and incalculable importance to the material prosperity and public welfare of a nation, supported by the scientific labors and practical success of those few bodies of organized sanitarians who have thus far embarked upon this wide field of professional labor; but only within the past few years has the sanitary condition of Washington city and its surroundings become the object of such public anxiety, and attracted the attention of the whole country.

The fact that Washington city is the seat of government, the abiding

place of the executive heads of the Departments, including the highest public functionaries of the land — the temporary residence of our National Legislature, the habitation of a large number of the leading and most influential citizens of our country, has within the last decade awakened an active interest in its sanitary surroundings, and practically resulting so far in organizing and formulating several plans for the removal or reclamation of these marshy districts, attempting to secure an improved condition of health, and relieving the National Capital from the unfortunate reputation which it apparently enjoys at present throughout the country.

It is not necessary that we should give in detail the various plans which have been proposed for the abatement or total removal of this public nuisance. *One* embraces the simple removal of the causeway of solid earth composing a part of the Long Bridge, thereby permitting the free flow of the river, carrying off with it the contents of sewers and other matters inimical to health which may empty into it above this obstruction. *Another* provides for the construction of dykes on the water margin of the marsh and the formation between these dykes and the solid banks of the river, embracing the whole area of marshy land, of a lake of pure water sufficiently deep to prevent the growth of vegetable matter, the whole to be beautified by trees and shrubbery, and the construction of graveled roads for pleasure drives. A *third* plan contemplates the filling up with solid earth the entire area of marshy deposit to the present boundary of the river, utilizing the space thus reclaimed for building purposes or for the construction of a public park, adding beauty to the city and securing comfort and pleasure for its inhabitants. No one of these plans, it appears to us, would fully and effectually accomplish the important end in view, since it is obvious that the first, whilst preventing the further accumulation above the obstruction, would leave the extent of marsh standing as at present, and probably exercise no influence whatever in a sanitary direction. The second would be impracticable as long as the causeway below remained, as a dam, to occasion new deposits by obstructing the outlet from the sewers above and the free flow of water charged with débris and silt.

The third, by far the most eligible and substantial in its practical results, would also be rendered futile, for the reason just given, of the obstruction below offered by the presence of a solid causeway. In order then to secure complete success and provide against all future contingencies, it will be necessary to combine the first and last plans above set forth; destroy the entire area of marsh by converting it into solid earth; confine the body of the river within a sufficiently narrow space to secure a permanent deep channel, remove entirely the literally *pons asinorum*, and permit an unobstructed flow of the incoming and outgoing tide. Now that the whole country has been interested in this subject, we may expect that the National Legislature will be urged to devise some such practical scheme for the accomplishment of a beneficent project so universally recognized and so imperatively demanded.

Whilst recognizing and advocating the sanitary necessity of removing this acknowledged source of disease in obedience to the popular clamor, based

upon the generally accepted theory of marsh miasm, we by no means intend to commit ourselves to the vague and undemonstrable opinion that our autumnal fevers are due to a specific agent *per se*, generated in these marshy deposits. Doubtless it may be said that we are groping in the twilight of ignorance, but not I hope of impotent effort, in pursuit of the truth respecting the proximate elements or specific nature of this so-called marsh malaria, and though aided in our researches for more than a century by the most delicate, ingenious, and complex mechanisms, as well as a perfect and thorough knowledge of all the mysteries of chemical analysis, in the hands of patient, pains-taking, and accomplished investigators, we have so far failed to detect by the most careful analyses of the atmosphere, water, or organic matters of these paludal districts, any material or imponderable agent to which may be ascribed this pathogenic force called malaria.

Proceeding upon the idea that certain types of fevers prevailing among those whose habitations were in the vicinity of marshy districts depended in some way upon the relation of contiguity to each other, and associating them as cause and effect, the early investigators into this subject very naturally directed their efforts to discover in what this supposed *materies morbi* consisted, whether of vegetable, telluric, or paludal origin; resulting in the popular belief, maintained by a majority of our profession at the present day, that from the decomposition of organic matters with moisture, under the influence of solar heat, there emanated a specific imponderable gaseous element capable of producing these fevers. The problem which presents itself at the present day is identically that which for so many hundreds of years has eluded the researches of scientific observers, and remains, so far as it relates to this particular agent, a hidden mystery. It resolves itself into two questions: 1st. What is malaria? Is it a distinct material entity of living organisms; is it the gaseous result of the decomposition of organic matter; or is it a hyperthermal force modified by humidity? 2d. In what manner does this invisible agent impress itself upon the human organism, and accomplish those wide-spread pathological changes which destroy the integrity of its organs and result in its decay and death? We all recognize the fact that the grand mission of the sanitarian is to prevent disease, and to destroy its source, its germ, and its spread — to deal with the prophylaxis and not the therapeusis. In order to successfully accomplish this mission, he must arm himself with all the resources of science and a perfect knowledge of what it is he is called upon to combat. In what does malaria consist? Whence cometh it? Whither goeth it? In contemplating the magnitude of this problem, the vast fields of laborious and scientific research which its solution must necessarily require, we are painfully impressed with the insignificance and inadequacy of any efforts which so humble an individual as ourself might make in the direction of its elucidation. It would be an act of presumption on our part to aspire to any higher achievement than the presentation of such crude hypothetical suggestions as may have occurred to our mind whilst investigating the recorded results of other observers; with the modest hope that they may possibly prove auxiliary to the labors of future inquirers. Whilst we are not prepared to concur in the



proposition of Reber to abandon entirely the term malaria, to avoid erroneous ideas which may result from its use, and substitute that of hyperthermia, or excessive heat, we have for a long period entertained the opinion that the term was vague and calculated to mislead us, and have sought to trace to some other origin than the so-called marsh miasm, those types of fevers supposed to be produced by this imaginary agent. Quoting from the profound, philosophical, and learned work of Professor Joseph Jones, touching cognate subjects, he says : —

“Whilst it is true that the amount of force annually received by the earth from the sun is a fixed quantity, it is nevertheless true that owing to the peculiar constitution of the atmosphere, the nice adjustment of its forces, the ease with which one mode of force may be converted into another, as heat into electricity and *vice versa*, its relations to moisture, its relations to the distribution of the forces of the sun, its relations to the distribution of the solid and fluid masses of the earth — the climate is subject to variations which cannot be predicted and are not uniform. Corresponding disturbances are produced in man. The truth of this proposition is conclusively demonstrated by the relations of certain diseases to the weather, and when disease is not directly produced by the disturbances of the structure and forces of the surrounding medium, it is nevertheless true that the course and phenomena of disease are modified to a great extent by meteorological phenomena. The value of the determination of these relations in the investigation of the origin, progress, and treatment of diseases cannot be overestimated.”

Recognizing the force and truth of these observations, it has often occurred to us that the possible solution of this question may yet be found within the domain of thermo-hygrometric phenomena, and the influence of these upon the human organism. The multitude of observers and writers since the days of Lancisci, in 1716, having signally failed to satisfy the medical mind by any conclusive and demonstrable proof of the existence of atmospheric abnormalities in these fever-producing regions, it is but natural that we should abandon the thus-far unsatisfactory and barren field of atmospheric analysis, and direct our observations if possible in some more promising channel. Dr. Oldham, of the British army, in a very able and valuable work upon this subject, entitled “What is Malaria?” closes his book with the following conclusions : —

1st. “That exposure at night in a malarious locality necessarily involves exposure to chill.”

2d. “That all the effects produced by so-called malarious influence, may be caused by the rapid extraction of animal heat without the intervention of any specific poison.”

3d. “That exposure to chill is admittedly the cause of the diseases which are constantly associated with malarious fevers, as well as of the recurrent attacks, or so-called relapses of the fevers themselves.”

4th. “That the effects of continuous exposure to a high temperature is at once to diminish the heat-generating powers of the system, and to increase the susceptibility to malarial fever, as well as to aggravate the intensity of

the disease. Under all these circumstances it appears impossible to arrive at any other conclusion than that *malaria is chill*."

It is somewhat remarkable that Dr. Oldham, who seems to have been a close and intelligent observer, should have pronounced in so dogmatic a manner his conclusion that "malaria is chill," especially as he manifestly had considered the condition precedent by his remarks upon the predisposing effect of heat upon the nervous system in producing chill. Having prosecuted his investigations into this subject for the most part in a torrid climate, where he could not fail to observe the constant and unvariable condition of high solar heat preceding the development of a chill, it would seem but natural that he might have associated the two together as indirectly cause and effect. If the simple sudden abstraction of animal heat constituting chill is a synonym for malaria, how does Dr. Oldham explain the occurrence, in many persons, of intermittent and remittent fevers in the so-called malarial regions, who have no chill. Every practitioner of medicine residing in those localities will testify to the fact that a large proportion of cases occur without having been preceded by chill at all, and yet we are forced to believe that they are produced by the very same causes which operate in those cases accompanied by chill. In view of the wide range of antecedent changes in the constitution of the blood interfering with the normal action of those organs which elaborate the blood, resulting in alterations of the fibrine and colored blood corpuscles and a disturbance of those chemical changes upon which the capillary circulation depends, as well as the profound impression made upon the cerebro-spinal and sympathetic system of nerves, constituting, in fact, the preëxisting and essential conditions to the production of malarial chill, and manifestly the progressive result of some causative agent, the conclusions of Dr. Oldham seem hasty and unscientific. Whilst Oldham declares malaria to be chill, Reber, who has written a clever and ingenious treatise upon this subject, also rejecting the term "malaria," proposes to substitute that of "hyperthermia, or excessive heat." In 1866 Dr. Saulsbury, of Cleveland, claimed that he had discovered the cause of malarious fevers to exist in the spores of *Gemiasma*, a form of algoid vegetation resembling the *Palmellæ*. He supported this claim by some ingenious experiments, which failed, however, in the light of subsequent investigations by others, to establish the truth of his theory. Hertz, in a most elaborate and exhaustive treatise on malarial diseases, found in Ziemmsen's "Encyclopædia of the Practice of Medicine" after discussing the various theories which have been presented upon the etiology or genesis of malarial fever, uses the following language:—

"In opposition to this view," alluding to the old theory of vegetable decomposition, "stands the fact that some marshy regions which present all the conditions for the development of such products of decomposition (some districts in Alabama, Peru, and elsewhere), some of which are even surrounded by the most notorious malarious regions, remain exempt from the disease. Furthermore, a number of extensive malarious districts are known, which are entirely free from the influences attributed to marsh lands, from surface water, dampness, etc. Among this number, according to

Hirsh, may be mentioned the high plateaus of Castile, the plains of Araxes, the terrace lands of Persia. The necessary conclusion from all this is that the telluric and atmospheric influences referred to above are not sufficient to account for the origin of malaria, and there must be additional causes at work, thus far unknown to us."

Here, then, we have a complete abandonment, by one of the most thorough and scientific observers, of the theory of marsh miasma, or gaseous exhalation from decomposition of vegetable organisms, and an acknowledgment that as yet we are groping in the dark in pursuit of some occult principle or factor, as the true and real cause of these paroxysmal fevers.

More recently, as late as 1879, a memoir was published by Klebs and Tomasi Crudeli, entitled "*Studi sulla natura della malaria Roma*," containing an exposition of results obtained by carefully conducted experiments upon rabbits, by means of subcutaneous injections of material taken from the Pontine Marshes, and other spots in the vicinity of Rome, claiming the discovery of a bacillus malarie capable of producing in these animals a form of fever, accompanied by certain pathological changes which they declared to be positive evidence of malarial infection. Without going into the physiological, pathological, and chemical questions involved in a consideration of these experiments, and the logical or illogical deductions arrived at, it occurs to us to say *en passant* that the accuracy of their conclusions might very properly be questioned, when the fact is considered that these very animals upon which they were experimenting, were probably the natives of those marshes, and had possibly subsisted upon these organisms, as a part of their natural food, without detriment; that if these bacilli malarie, which abounded in the very habitations of these rabbits, were capable of producing a specific disease when introduced into their bodies, is it not reasonable to suppose that they would have been affected as other animals are known to be when exposed to highly malarial regions? We all are aware that both horses and dogs are subject to such attacks, and exhibit the true intermittent type of malarial fever when subjected to those agencies in a potential degree, which produce similar fevers in the human system. The report of Surgeon George M. Sternberg, of the United States Army, made at the request of the National Board of Health, upon the memoir of Drs. Klebs and Tomasi Crudeli, furnishes a very conclusive refutation of the bacillus malarie theory advanced by those distinguished observers. The observations made by Dr. Sternberg seem to have been conducted with great scientific skill, diligence, and impartiality, with the commendable object of seeking the truth, and not to sustain a theory. Closing his report with the conclusions to which his investigations had led him, he says:—

"Among the organisms found upon the swamp lands near New Orleans, and in the gutters within the city limits, are some which closely resemble, and perhaps are identical with the bacillus malarie of Klebs and Tomasi Crudeli; but there is no satisfactory evidence that these or any other of the bacterial organisms found in such situations, when injected beneath the skin of a rabbit, give rise to a malarial fever corresponding with the ordinary paludal fevers to which man is subject."



It is clear to our mind, in the light of Dr. Sternberg's experiments, as well as in accordance with daily observations, based upon orthodox pathology, that the fevers produced in these animals were purely septic, and resulted from the introduction into the tissues of foreign matters capable of exciting inflammation and suppuration, and not to any specific organism, as they claim. The metastatic abscesses found in some of these rabbits conclusively establishes this opinion. With other conclusions touching the origin of the so-called malarial fever embraced in his report, we are not prepared to concur, but readily accept the one just quoted as corresponding with the views which we are disposed to entertain upon this subject.

The second question presented above for our consideration was, "In what manner does this invisible agent impress itself upon the human organism, effecting pathological results, and producing paroxysmal pyresis?" Accepting the hypothesis of a thermo-hygrometric pathogenesis based upon the fact that a long sustained high solar heat, modified by rapidly varying conditions of atmospheric moisture, is always found to exist, we are naturally led to determine in what particular manner, or through what particular organs, heat in a plus or minus degree operates upon our bodies. A distinguished physiologist teaches us, that "as we rise in the scale of animal and vegetable existence, the phenomena of life become more complex, and the conditions of their being more complicated and restricted. The simpler the structures, the feebler the vital nervous and physical forces, and the less complicated the conditions of existence. Cold-blooded vertebrate animals, although more highly organized than invertebrate animals, still show remarkable powers of enduring extremes of heat and cold without death. Fish may be frozen and then thawed out without producing destruction of life. The rapidity with which absence of heat is attended with loss of sensibility and death, is directly proportional to the development and perfection of vertebrate animals. All the acts called vital and nervous and muscular by many physiologists, such as the contraction of the muscles, and the transmission of impressions to and from the nervous sensitive centres along the nerves, are due to the chemical changes of those elements which have been separated from oxygen and elevated into a state of force, through the forces of the sun."

Lobstein, in his elaborate work on the structure, functions, and diseases of the sympathetic nerve, says:—

"It does not seem improbable that the ganglia which diversify the trunk ought to be considered as the laboratories of that principle which the internal or excremental branches conduct to the viscera, and of the nature of which we are entirely unacquainted. The branches of the sympathetic belong principally to the arteries, which they envelope, while the finest filaments which follow the arterial branches into the organs are terminated in the external coat, since it is manifest that the vessels are primitively constituted under the government of the nerves, and that from them the forces and energy are borrowed with which they operate in the functions of nutrition and secretion. In reflecting upon the nature of intermittent fevers, I have thought that it might, perhaps, be found in the disordered and perverted

action of the abdominal nervous system, and there appears to be indeed sufficient ground to render this opinion probable. The paroxysms of intermittent fever are tied down to a regular rythmus in consequences of their being radiated in the nervous system upon which nature has impressed a law, according to which they must perform their functions periodically."

In view, then, of these physiological facts advanced by so learned and profound a teacher as Lobstein, and recognizing the important vital factor of heat in the performance of those functions, presided over and directed by the system of nerves in maintaining a state of health, let us consider how far it may be possible for this same potent agent, solar heat, under certain conditions, to aberrate the normality of those physiological acts, and produce disease. With many physiologists the belief prevails, that there is a special excito-caloric, or calorifacient nerve centre which presides over or regulates animal heat, and that this centre can be influenced by external impressions capable of producing disease. Lobstein relates the case of a friend of his whose hair became white in one night, produced by fright at the burning of his house ; and asks the question if this was not produced by mental suffering deranging the abdominal nerves, thereby disordering and changing the force and function of these nerves, and affecting the nutrition of the capillaries.

Much confusion evidently prevails in regard to the mode by which heat affects the temperature of the human body. The generally accepted opinion, that when the human body is exposed to the influence of heat, the conduction of heat into the body, or its absorption, causes an actual increase of temperature of the blood, producing the sensation of discomfort experienced, is erroneous. This has been proven by numerous experiments, showing that whilst the human body may be placed in a temperature of  $212^{\circ}$  F. no material elevation of blood heat ensues, nor does the individual sustain any injury so long as an active effort of the nervous system to protect the body by means of increased perspiration and vaporization remains unimpeded. The heat necessary for such a function is not that communicated to the body by convection from the surrounding air, but that which is evolved by vital forces under ordinary circumstances. Were the body not protected by this increased flow of perspiration and active vaporization, preventing the heated atmosphere surrounding it from actual contact with the surface, a quick destruction of its tissues would follow. Instead, therefore, of a direct impression being made upon the nerve centres by the centripetal convection of heat causing exalted excitation, exhaustion, and paralysis, these conditions are due, we believe, to the demand made upon the nerve centres through the external afferent nerves distributed to the cutaneous surface, acting as sentries stationed at the outpost of the human citadel. Receiving the impressions of external heat, they arouse the garrison within to active and energetic defense by evolving sufficient animal heat to keep the surface of the body supplied with moisture, reducing temperature by its evaporation. When we consider the physical structure of the human integument, its remarkable capacity as a non-conductor of heat, added to the vital forces brought into play as an auxiliary power against the direct

introduction of heat into the body, it is not difficult to understand such a theory. Assuming this to be true, we can readily comprehend how exhausting and enervating the effort on the part of these receptive nerve centres must be in maintaining the normal temperature of the body when it has been subjected to a protracted insolation, and a consequent drain upon the vital resources of its nerve power.

We all agree that continued high temperature is an essential element or prerequisite of the so-called malarial fevers, and many regard it as the only cause of such fevers, maintaining that the fever is simply the result of exhaustion and a paresis of the ganglionic nerve centres, accompanied by a profound disturbance of their influence over the circulation. Reber, who has advanced this theory, attempts, by some plausible and ingenious reasoning, to sustain his views upon pathological and physiological grounds. We have already declared our dissent with the theory that hyperthermia *per se* is the sole pathogenic agent in the production of these fevers, and expressed our belief that the true cause of the so-called paludal fevers may be found in the varying conditions of atmospheric heat and moisture. In other words, the hypothesis which we propose is, that no such agent as marsh malaria, as at present understood, exists, and that those phenomena affecting human health, heretofore attributed to this germinal or gaseous force, emanating from certain marshy localities, are simply the results of prolonged insolation — primarily, varying in individuals according to constitutional differences ; secondarily, the sudden modification of this insolation by atmospheric humidity, affecting bodily sensation but not always thermometrically appreciable, and operating directly upon the impressionable sympathetic nerve centres, ultimately accomplishing, through an aberration or loss of functional energy in these, certain morphotic and chemical changes in the blood and its products, as essential conditions to the development of paroxysmal fevers. Dr. Copeland, combating the doctrine that the causes of fever first affect the cerebro-spinal nervous system, says : —

“The early lesions, whether of function or organization, characterizing the first as well as the advanced period of fever, cannot be accounted for by assigning the cerebro-spinal nervous system as the primary seat of the disease ; as it does not control animal heat, so it cannot induce those remarkable extremes and morbid states of temperature distinguishing the malady. As it does not supply nor materially influence secreting surfaces and glands, so it cannot give rise to those early changes of function which they present, nor to those lesions of structure which they often subsequently experience ;” further declaring, “the efficient agents of fever act primarily and chiefly upon the organic or ganglionic nervous system. The intimate connection of this system with the organs of circulation, respiration, secretion, and assimilation, show that morbid impressions made upon it must necessarily affect all the organs and parts with which it is related.”

Tables illustrating the effects of malaria upon the specific gravity of the blood and of serum, prepared by Becquerel and Rodier, and by Joseph Jones and others, the healthy standard of blood being from 1055.0 to 1063.0, and that of serum from 1027.0 to 1033.0, show in malarial fevers of several



weeks' duration a decline to 1034 to 1036 in blood, and 1018, 1021, 1022 in serum. The same series of tabulated facts by these observers, demonstrate a diminution of both red corpuscles and fibrine, as well as the formation of heart clots in patients who were the subjects of intermittent and remittent fevers. Referring to those tables, Professor Jones says: "That so far as these observations extend, the colored corpuscles are more uniformly and rapidly destroyed in severe cases of malarial fever than in any other acute disease."

The fibrine is not only diminished in malarial fevers, but it is altered in its properties and in its relations to the other elements of the blood and the blood-vessels. If excessive heat, *per se*, was capable of producing these paroxysmal fevers, as Reber would have us believe, we should find them prevailing as a pandemic in both temperate and torrid zones, without regard to special localities or the topographical features of the country, which we know, with very rare exceptions, is not the case. On the contrary, the presence or proximity of marshy or damp areas has been found almost invariably to exist.

It would, therefore, seem impossible, in considering the essential nature of malaria, to separate it from certain physical telluric conditions with which it is obviously associated, as cause and effect, and correlated by the more potential factor, solar heat, in the production of the so called malarial fevers. Resting upon the postulate just presented, we shall proceed to a consideration of such additional facts and observations as, in our judgment, go far to support it. The experiments of Shubler (who has been recognized as the highest authority by Schmidt, and other distinguished meteorologists of Europe), perhaps the most elaborate, scientific, and accurate ever made in the same direction, to determine the relative amount of evaporation from different sections of the globe, embracing bodies of water, and damp and arid surfaces of land, show that the evaporation from marshes not covered by water, and from damp, undrained areas of earth, *exceeds by threefold* that from the surfaces of running or standing bodies of water. Level plateaus of grass, kept wet, evaporated more than three times as much moisture from the same area of surface as water. It thus follows that the supply of humidity to the atmosphere by these damp or wet surfaces of earth, exceeds that from any other source of equal extent, and exercises a more potential agency in determining that condition of atmospheric temperature which indirectly influences our nervous systems, giving rise to sensations of heat or cold. It is thus obvious that those who inhabit such localities, or who are exposed for any length of time to the varying influences of such temperature, when subjected during the day to high solar heat, and followed by a rapid refrigeration at night, become more liable to attacks of fever; and that such fevers arise solely from the morbid impressions made upon the organic nerve centres and the circulation, by the combined effects of insolation and refrigeration, and not by any specific agent whatever. In support of this hypothesis, we might cite numerous instances recorded by Henmen, Ferguson, and many other surgeons of the British army, during their campaigns in India, who mention that the soldiers suffered from attacks of

intermittent fever in regions remote from marshy districts and entirely free, so far as they could determine, from any of the recognized sources of malaria. These men, it appears, were exposed to great heat during the day, but encountered a fall of temperature at night which required them to use blankets.

During the months of July and August of the present year, by the direction of the United States government, a survey was made of the Roanoke River, which runs through the southern border of the State of Virginia. The party consisted of thirty-four men. They left Danville, a small town near the head of navigation, on the 8th of July, and proceeded with their work down the river in the direction of the ocean. It is proper to state in advance that for the most part the land bordering this stream is in a state of cultivation, and that there are no marshy districts to be found on either side; in many places the banks are abrupt and wooded. The areas of low, flat land adjacent to the river increase as you descend toward the point at which it enters the State of North Carolina, and are designated by the inhabitants as "bottom, or lowlands." For the first three weeks after leaving Danville, but one case of fever occurred; the average range of thermometer being, at 7 A. M.,  $86^{\circ}$  F.; 12 M.,  $114^{\circ}$ ; 7 P. M.,  $98^{\circ}$ ; 10 P. M.,  $88^{\circ}$ . About the end of the fourth week, having reached that portion of the river bordered by a greater extent of bottom lands, but entirely free from marshes, the decided influence of the damp meadows upon the temperature at night was shown by the following average of thermometer: 7 A. M.,  $84^{\circ}$ ; 12 M.,  $114^{\circ}$ ; 7 P. M.,  $92^{\circ}$ ; 10 P. M.,  $82^{\circ}$ . Contemporaneous with this variation of  $32^{\circ}$  F. between midday and 10 o'clock at night, several cases of intermittent fever appeared, notwithstanding the men were required to be under cover on board of the vessel at 9 P. M., and not allowed to go ashore until after sunrise. A sudden fall of temperature, producing what was called a "cold snap," occurring soon after, reducing the temperature at midday some twenty-five degrees, the attacks of fever became general, including in the space of a few days the entire number of men on board at that time, except one. The obvious conclusion from the above brief statement of the facts and circumstances attending the survey, fully sustains our hypothesis, and demonstrates that these attacks of fever resulted from exposure to a higher solar heat for the first three weeks, deleteriously impressing itself upon the sympathetic nerve centres, and thus preparing the organism for the subsequent development of fever when exposed to the immediately exciting cause of that refrigeration produced by the increased evaporation from those low and damp areas bordering the river at this point. For the first three weeks the immunity enjoyed by these men was doubtless due to the insufficient insolation and the limited degree of variation of temperature. An analogous case corroborative of this explanation may be found in the well-known fact that travelers across the vast desert of Sahara, after being exposed to the intense heat of the arid expanse of burning sand for many days, are often seized with chill and fever almost immediately after reaching the oases, or damp and vegetative spots, found scattered by the beneficent hand of nature along this desolate waste.

It would be at variance with a rational pathology, as well as opposed to

recognized etiological truths, to attribute these sudden attacks of fever to the immediate introduction into the system of germs or gases. No such agents could affect the human organism with such rapidity unless it be some eminently toxic substance capable of destroying life.

It is somewhere related that during the visit of a certain commission of scientists appointed by the government to make observations upon the Pontine Marshes, near the city of Rome, for the purpose of ascertaining the true cause of its proverbial insalubrity, they found but one individual who had resided there beyond the period of ten years, in the person of an old basket-maker, who occupied a hut located immediately within the fever district. Naturally supposing that valuable information bearing on the object of their mission might be obtained from so old an inhabitant, they visited his hut at nine o'clock in the morning, but were refused admittance, receiving as an answer to their inquiries of the aged occupant, the reply that he never opened his doors or windows until midday; that it had been his custom during the entire period of his residence there to retire before sunset to his hut, close all avenues from the external air as far as practicable, and keep up a fire until noon the following day, and that he had enjoyed uninterrupted health, whilst his neighbors had either fallen victims to the fever within a short period, or been compelled to change their residences to some distant point. The absence of fever in this case was manifestly due to the maintenance of an equable temperature through the agencies of fires kept up during those hours when the greatest fall of temperature occurs, and not, as was supposed at the time, to the dissipation by heat of an imaginary marsh miasma.

The pertinent inquiry may possibly have suggested itself, that if these fevers are developed by sudden transitions from heat to cold or rapid decline of temperature, why is it that the inhabitants of mountainous regions, where such rapid variations constantly occur, are known to escape? We reply, that in consequence of the topographical features of the mountain, its irregular surface of deep ravines and angular peaks, the sun's rays fail to fall vertically upon any given spot for many consecutive hours, but soon descend obliquely, and thereby lose their power and force. It is probably in consequence then, of this physical fact, that the inhabitants of such districts escape the essential antecedent condition of prolonged insolation, and hence are not affected by the nocturnal fall of temperature. Upon the same principle may be explained the phenomena so often witnessed of individuals who have resided for any length of time in malarious districts during the heated term, and who have already been affected with intermittent fever or have escaped it, when transferred to elevated mountainous situations, immediately developing paroxysmal fever; the pathological conditions already existing, it only needs the exciting agent of refrigeration to produce the paroxysm.

If the same thermo-hygrometric status of the atmosphere were to exist at an elevation of 5,000 feet above the level of the sea as that which is found on the plains below, subject to the same variations of temperature, we should undoubtedly encounter these fevers. It is the custom of the negroes living on or near the low lands in Eastern Virginia to light fires at night for the



purpose, as they say, of driving off the fever, without, of course, comprehending the *modus operandi* or *rationale* of their sanitary precautions. We find, indeed, the same idea advanced by Sterne in "Tristram Shandy," where he makes Corporal Trim say to Dr. Slop, in describing the siege of Limerick : —

"It lies, and please your honor, in the middle of a devilish wet, swampy country, cut through with drains and bogs that brought on the flux which liked to have killed both his honor and myself. There was no such thing after the first ten days as for a soldier to lie dry in his tent without cutting a ditch around it to draw off the water, nor was that enough, for those who could afford it, as his honor could, without setting fire every night to a pewter dish full of brandy, which took off the damp of the air and made the inside of the tent as warm as a stove."

In the piny forests of some portions of Virginia and Carolina there is a substratum of argillaceous earth preventing the percolation of rain, and covered by a superficial layer of porous sandy soil, for the greater part of the year kept damp, but remote from any aggregations of water or marshes ; yet we find here intermittent fever prevailing for many months of the year, evidently produced by the refrigerating effect of the moisture supplied after nightfall from the damp earth, correlated by the continued high solar heat through the day. During the months of July, August, and September, we are informed that intermittent and remittent fevers appeared along the valley of the Connecticut River, and many other localities in the northern section of the United States, where it had rarely ever occurred before, and where there was no visible source of malaria. This was doubtless due to the prolonged solar heat during the day, with the sudden decline of temperature at night in these localities.

It is a well-known fact that drainage and cultivation abates or entirely destroys the so-called malaria. Suburbs of cities previously unhealthy in consequence of the presence of wet or damp areas, become healthy as soon as they are thoroughly drained and built upon. We are told that on the island of Hong Kong, which consists entirely of weathered and decaying granite, so long as this remained undisturbed, the existence of malaria was not even suspected, but so soon as excavations for building purposes were commenced, turning up and exposing to the air the disintegrated and moist granite, intermittent and remittent fevers, to an alarming extent, attacked those engaged upon the work. Instances of a similar character, going to show the important part played by insolation and refrigeration in the production of paroxysmal fevers, in support of the thermo-hygrometric hypothesis, might be cited almost *ad infinitum*.

With regard to the rhythmic character of these fevers, concerning which there has been so much fruitless speculation, we have no explanation to offer beyond the admission of our ignorance as to the cause, and feel constrained to rest for the present under the belief that it is regulated by some occult principle of our organisms, or perhaps controlled by some of those natural laws which unconsciously to ourselves affect our physical beings. We can no more demonstrate why a tertian intermittent should observe that perio-

dicity, than we can explain why in women the catamenial evolution should occur with regularity at the end of every twenty-eight days, or why at the same period the serpent should annually divest itself of its epidermis.

In conclusion, we desire to emphasize the hypothesis which we have attempted to present in this paper, by repeating that the hitherto recognized sources of marsh miasma, whether they consist of genuine paludal districts or areas of damp earth, exercise their pathogenic influence solely by variations of temperature, or hygrometric conditions of the atmosphere affecting our bodies, producing in those who have undergone antecedent insolation, paroxysmal fevers; but in those who have not, possibly attacks of acute pyrexias, such as pneumonia, bronchitis, nephritis, pleuritis, diarrhœa, etc. The researches of Virchow long ago demonstrated that malarial fever was closely related to heat, since he showed that pigment granules were found in abundance in the livers, spleens, and blood of those affected with malarial fevers, a fact which has been relied upon by modern pathologists in determining the differential diagnosis of typhoid and malarial fevers, — the pigmentation being the crucial test by which the latter is recognized, no such element being found in the blood of the former. In this connection the question suggests itself, inasmuch as it is an admitted fact that the negro race is capable of resisting the extremes of heat far better than the white, and is also said to be less liable to attacks of so-called malarial fevers, can it be due to the presence of the thick pigmentary layer in the rete mucosum of the former, provided by nature as a natural prophylactic against the rays of the sun, that antagonizes or neutralizes the tendency of insolation to produce an abnormal pigmentation of the blood?

## XVII.

### THE YELLOW FEVER EPIDEMIC AT NEW ORLEANS IN 1878.

SUBMITTED BY THE NEW ORLEANS AUXILIARY SANITARY ASSOCIATION,  
DR. C. B. WHITE, SANITARY DIRECTOR.

DURING the epidemic of yellow fever at New Orleans in 1878, the daily papers published each morning the deaths registered with the Board of Health during the preceding day.

The writer observed a seeming preponderance of deaths of males of four years of age.

As no reason suggested itself, accounting for the supposed fact, it was considered important to analyze the total mortality caused by yellow fever in the year 1878, to tabulate the results of the investigation, and thus determine whether this apparent preponderance of deaths of four-year-old males was seeming or real.

Examination of this table confirms what has long been known, the preponderance of cases of fever and deaths of adult males as compared with those of adult females.

This investigation demonstrates a great proportionate amount of child mortality from two to five years, but still more strikingly exhibits the enormous proportionate mortality of four-year-old males. This preponderance of deaths of males at four years appears with blacks as with whites.

Examination of the record having thus determined that an excessive mortality of four-year-old males existed, a second topic for consideration arose: Is not the greater proportionate number of deaths as now shown, due merely to the existence of an excess of cases of sickness, at the ages found most mortal. The doubt so raised could only be settled by an analysis of the cases registered with the Board of Health, amounting in number to 23,707; but it was known that a large number of cases were so incompletely registered as to be of no value in a scientific investigation.

The books of registry of the epidemic of 1878, by the courtesy of the Board of Health, through its President, Professor Joseph Jones, M. D., were cordially placed at the service of the New Orleans Auxiliary Sanitary Association.

The analysis of the records was made and the tables prepared under the direction and supervision of Mr. John C. Henderson, Secretary of the New Orleans Auxiliary Sanitary Association. The preparation of the charts was entirely his work.



It was observable that of a total of 23,707, but 13,635 were properly registered, all needed particulars being given. The fact that this care was taken in so many cases by so many over-worked doctors, makes the statistics the more trustworthy. It is believed that 13,000 is a sufficiently large number from which to make deductions; that the law governing these may, without risk or error, be considered applicable to the remaining ten thousand.

The importance of thoroughness in reporting fully what vital statistics require, is well illustrated by the table, showing that had the single fact of age not been omitted in cases otherwise properly registered, the results of the analysis of twenty-five hundred more cases would be on record.

It is complimentary to the physicians of New Orleans, that so many of them, worn out with fatigue, eating hastily-swallowed food, from exhaustion of brain and loss of rest, dropping instantly asleep in carriage and horse-car, anywhere, indeed, if sitting down and not mentally or physically at work, should be so mindful of the law and of science, as to fully record all particulars.

In many of the cases not fully given, the facts were perhaps not ascertainable, and in a large number of cases were omitted from inadvertence, the result of exhaustion. Much the larger part of the defect of the statistics is due to carelessness, indifference, and even contumacy on the part of some practitioners.

The Board of Health (whose personnel is at present entirely changed) deserves blame, as it did not enforce its ordinance requiring full reports, the ordinance having been in existence for a number of years, and being well known to physicians.

Later in the epidemic the Board acted, and threatened suit against those not reporting. One of the results of the lack of such energy earlier in the season is the large number of 3,830 cases, in which neither sex, age, color, or name is given. I am sorry to say that the cases of some of the best practitioners of the city are included in this 3,830.

An examination of tables or chart shows:—

First. That the mortality of boys at four years is not because a very much larger number of boys were taken sick, but that there is an actual greater mortality.

Second. It is seen that though the deaths decline with great rapidity, — being at four years 344, at five years 169, at six years 65, — the cases do not decrease in the same ratio, but decline as follows: Cases at four years, 822; cases at five years, 740; cases at six years, 624; the recoveries being proportionately much larger.

Third. From seven to eleven years of age the death-rate remains nearly uniform, the disease being comparatively much less fatal.

Fourth. The smallest number of cases and deaths in 1878 occurs at the ages at which the protective influence of the epidemic of 1867 would be felt, provided the proportionate frequency of cases and of deaths of children was the same in 1867 as in 1878.

If the greatest effect of age on yellow fever cases and mortality in 1867 was at four years, then a less number should suffer in 1878 at the age of fif-

teen than at any other. The chart and tables show this to be true, and generally true also of those who in 1867 were two, three, four, and five years old. It is a fair inference that the law of 1878 was that of 1867.

Fifth. In the census of New Orleans of 1880, by age, sex, and color, for which the writer is indebted to the never-failing courtesy of Gen. Francis A. Walker, Superintendent of the Census, it is found that there are fewer male children of six years old in New Orleans than of any other age. An additional evidence of the facts deduced from examination of our local records of vital statistics.

Sixth. When ages approach to twenty the influence of voluntary change of habitation render reliable conclusions unattainable.

Seventh. In considering the cases and mortality at ages from nine to twelve, it perhaps should be mentioned that 587 deaths by yellow fever occurred in 1870, and assure the existence that year of 2,000 or more cases. The fever of that year was confined principally to a section of the city twelve squares deep from the river by five broad; but seemingly its influence appears in the vital statistics recorded in these tables.

Eighth. As to the causes of greater mortality, about one half of all those born in large cities die before attaining the age of five years. In New Orleans, however, the tables report a mortality of but thirty-three per cent. under five years. The diminution of the numbers of those between five and fifteen years of age and liable to yellow fever, is an element commanding consideration. At four years, especially of males, some physicians who have been made familiar with the foregoing facts, express the opinion that, as is well known, quiet manageability is an important element of recovery, and that males of four years are enough more intractable than at other ages, or than females at the same age, to cause the difference in the result.

As the number of girls and boys attacked is so nearly the same, it can scarcely be anything belonging to a "developmental" condition.

Only one other reason has been suggested. It has been alleged that the poisonous cause of yellow fever is particulate, of the lowest animal or vegetable nature; that its habitat is soil surfaces in general, and that it multiplies and spreads much as the cellular mycelium of certain microscopic fungi are known to live and flourish.

That whether brought by "resting spore" or cellular, actively growing mycelium (the equivalent of a bud), it thence as from a centre spreads, and that whoever takes enough of these as yet undiscovered, but imagined invisible but poisonous hyper-microscopical toad-stools, is attacked by yellow fever.

Taking this as possible, perhaps probable, they say the infant of the year lives in its mother's arms, and is but occasionally and temporarily on the floor. That the child of two years, though living much more on the floor than the child of less than a year, yet still spends much time in arms, upon the bed, couch, sofa, etc. That the three, four, and five years old sit and live all the time on the floor and upon the surface of the yard. That the plays of boys especially are upon the ground, and therefore children of that

age take up more of the poisonous cause than those of ages immediately preceding or following, and in the boy of four the exposure by reason of contiguity to poisonous surfaces is greater than that of boys of other ages, or girls of the same age. In a word, as the tables indicate, in the boy of four the liability to yellow fever and to a fatal result reaches a maximum.



## XVIII.

### PRACTICAL EXPERIENCES IN REGARD TO THE INFECTION OF VESSELS WITH YELLOW FEVER AT HAVANA.

By DANIEL M. BURGESS, M. D.,

*Havana, Cuba.*

THE remarks and observations which are now submitted to the consideration of the American Public Health Association, relative to the infection of vessels in the harbor of Havana by yellow fever, are offered with much diffidence, as they are mainly the result of personal experience and observation during the last fifteen years, the last two while in the employ of the National Board of Health as its Sanitary Inspector at that port.

That the crews of vessels contract yellow fever at Havana is a fact as apparent as the truth that scores of their numbers die annually of the disease at that port, but that vessels themselves become infected might not be so palpable at first sight.

Repeated opportunities for observation and watchful attention to the sanitary vicissitudes of vessels while in port, combined with a knowledge of their anterior as well as subsequent sanitary histories, reveals the fact that ships have arrived in the harbor of Havana, fresh and new, on their first trips, from the temperate coasts of Maine, or the more frigid ones of Norway, with every member of their crew perfectly well, and with no history of disease *en route*; that those ships have in due time gone to some wharf to discharge; that soon after members of their crew have sickened and died of yellow fever; that one after another of them have yielded to its morbid influence, till all on board who were susceptible to the disease have had it. The vessel, discharged of her cargo and with her crew now in good health, leaves in ballast to load for home or some foreign place, at some other port of the island, where she arrives and casts anchor near and to the windward of a fleet of merchant vessels, all of which are healthy, as well as the town.

In a few days cases of yellow fever are developed on the nearest leeward vessel, and soon after cases occur on board of those in close proximity to the latter, until quite a number of the mercantile fleet are invaded by the disease. There is good evidence that a harbor epidemic of Matanzas was caused in this way a few years since. Such well known instances go far to prove, not only the infection of vessels by yellow fever, but the portability of its virus.

Another illustration: It is not seldom that Spanish vessels, on arriving at the harbor of Havana with cargoes, when yellow fever is raging, discharge all persons who do not enjoy an immunity from yellow fever.

They then go to a wharf to be unloaded by protected men from ashore. That the wharf and locality is infected is proven by the fact that crews of all the vessels at it are suffering more or less from the disease. After such vessels are discharged at these infected wharves by men who have had yellow fever, they go out into the open bay, with no evidence of contamination, and anchor in close proximity to vessels which had remained free from disease for weeks. With the change of wind and tides the vessels swing, and, at times, get so near each other that they practically become one vessel.

In a few days cases of yellow fever begin to occur on the vessels which had been so long healthy. Their infection can be clearly traced to the vessels which had been in bad company at the wharf, but on board of which, for plain reasons, not a case of yellow fever had occurred. Instances like these occur every season in the harbor of Havana. Two striking ones happened this year.

Vessels sometimes lay at wharves discharging, and as fast as members of their crew fall sick they are sent to the hospital, or discharged. They go into the open bay with no sickness aboard, and no external evidence of infection, until some unfortunate neighbor, who has up to that time been healthy, gets sick. These are truthful instances of the infection of ships and portability of the poison of yellow fever, and they occur often enough in Cuba to be easily observed by a person whose business and tastes interest him in such matters.

It being, then, admitted that vessels do become infected by yellow fever in the harbor of Havana, the questions naturally arise, by what means they become infected, and are they equally prone to do so in all parts of the harbor? These two questions are more conveniently answered by answering the last first, viz.: Are vessels equally prone to become infected in all parts of the harbor? All of my experience enables me to give an emphatic negative to the answer, and affirm that the infection of a vessel has a constant relation to the wharves, shore, and centres of population, and the proximity of a ship to them.

Experience has proved that wharves are always dangerous, some of them even in winter. The danger of infection constantly diminishes with the distance which a vessel is from the wharf. It is believed that at five hundred feet or over, particularly on the windward side of an infected wharf or vessel, the danger from infection becomes small. I will mention here, what all will undoubtedly admit, that favorable winds are an important factor in the spread of yellow fever, and contrary winds in the prevention of it, and that high winds and hurricanes diffuse the poison, so that epidemics are often checked by them. A small hurricane occurred at Havana the night after the total eclipse of the sun in August, 1878, and yellow fever, which had been very active in the pursuit of victims previously, became so sluggish and dormant that very few cases of the disease occurred for weeks afterward, in fact that season.

But to return to wharves, and the danger of infection by them. This is so common and so apparent that even owners and captains of vessels remark, that as long as their barks stay in the open bay they continue free from dis-

ease, but that soon after they go to the wharf their crews begin to sicken of yellow fever.

I will cite a case. The American barks *Antonia Sala* and *Havana* are owned by the same parties, and are employed mainly in carrying crude petroleum to Havana, and bringing to the States sugar from Cuba. They are models of cleanliness, and in all respects their sanitary condition is good. The *Havana* is nearly a new vessel, and up to August last her sanitary history was perfect. The *Antonia Sala* is older, and in 1880 had yellow fever occur aboard, occasioned by her crew visiting a neighboring infected vessel. About the last of August of this year, they were both found in the harbor of Havana, with crews liable to yellow fever. They brought and carried away the same cargoes, and remained in port about the same length of time. The *Havana*, which had never had yellow fever aboard, discharged in the open bay with no sickness, but she then went to a wharf to take on her cargo, and in less than four days three cases of the disease, in a very severe form (two of them vomiting black), occurred aboard. The *Antonia Sala*, which had had yellow fever in 1880, but which now discharged and loaded in the open bay, far from the wharves, and remaining in port about the same time as the *Havana*, sailed away without disease occurring. This is a striking instance, and yet instances equally striking occur every week during the summer months in Havana, to prove the danger of wharves, and the proximity to them, and the comparative safety of vessels in the open harbor, distant from any infected vessels, with their crews kept aboard. Cases like this prove that vessels can enter the harbor of Havana, discharge, and even load, without becoming infected, providing they do it under conditions, which will be spoken of further on.

From the 20th of August, 1879, to October, 1881, a period of little over twenty-five months, I had inspected, and had under observation for the National Board of Health, over one thousand three hundred vessels, comprising those of every kind, shape, size, nationality, and in every state of hygienic condition. Out of the thirteen hundred vessels, one hundred and fifty, or a little less than one in eight, had yellow fever occur aboard; and I am forced to say that in all those infected vessels the strongest proof exists to me that they became infected in consequence of their nearness to or contact with the wharves or land (save the few which were evidently infected by other infected vessels). Vessels lie in the open bay in every state of filth—in a high temperature—surrounded by an atmosphere moistened almost to a point of saturation, and enjoy freedom from yellow fever; but let them once get near a wharf, an infected vessel, or take on an infected cargo, and soon they become invaded by the disease, and all the sooner, and more severely so, for their filthy condition.

In the one hundred and fifty infected vessels alluded to, I fail to get any evidence of spontaneous generation of the disease aboard. In every instance of infection it can be satisfactorily accounted for and explained, by relation of the vessel to the shore and centres of population, or through the agency of articles taken aboard, or by the visits of the crew to the shore, or proximity of infected vessels. Among the substances brought on board



which may infect a vessel is ballast. Ballast at Havana is of four kinds: First, a white or light-colored and tolerably hard and compact stone, which is quarried on the south side of the bay, opposite to Havana, and remote from any centre of population. From that point it is taken directly aboard of the vessel without its being stopped at any infected wharf or inhabited locality. I mention this ballast only to commend it. It is the best to be found at that port, but unfortunately not a large quantity of it is used. It is the ballast which all vessels bound to the United States should use, in summer especially.

The second kind of ballast is a porous, friable, blueish gray stone, easily and quickly breaking down on exposure to ordinary violence, or to a moist atmosphere, and is quarried or dug out of the hills south of Regla (a town on the south side of the harbor), and has much earth with it. From that point it is brought in large quantities to the wharves of Regla and the streets terminating on them, and dumped down to remain there till vessels require it. Here it not only receives the surface drainage of a city of fifteen thousand or twenty thousand inhabitants, but much excrement and filth peculiar to the people is deposited on and among it. This cannot be regarded as always a healthy ballast, and doubtless may become a vehicle for infecting a vessel. At any rate, it should always be disinfected in the vessel when used, which is quite often, as the ease with which it is extracted makes it cheap.

The third kind of ballast is one that has not been extensively employed, but has been occasionally used when other kinds have been scarce and dear. It consists of mud, earth, and refuse, scraped up directly from the shores of the harbor. This kind of ballast was taken by at least one of three vessels which sailed from Havana for Savannah (this city) July 9, 1876: namely, the Spanish bark *Maria* and the Spanish brigs *Pepe* and *Inez*. This filthy ballast, which one of them took, came from an indented shore at the foot of a bluff on which the fortifications known as Numero Cuatro are erected, and down to which point they drain. Hard by are Chinese barracks, and a low class of people. Vessels which lay in this vicinity, both before, at the time, and after the ballast was taken, suffered from yellow fever, even in the months of March and April. Now, although I am not prepared to affirm that the yellow fever epidemic in Savannah (this city) was caused by this ballast, I will say that I can easily understand that it may have been. There certainly was enough in and around the ballast to infect it and the vessel which carried it. I need not say that this ballast is very objectionable, and should never be used.

The fourth kind of ballast is that which is taken from other vessels, and may or may not be infected. After ballast, the remaining articles which may be vehicles for the conveyance of the germs of yellow fever aboard of vessels, are sugar, tobacco, and baggage. Some of the store-houses for sugar are infected, as those of San Jose and Tallapiedra. They are situated on wharves on either side of the ever-infected military hospital and arsenal, in a district which is marked yellow on the map, and which from its peculiar low and insanitary character can furnish cases of yellow fever every month

in the year. Here sugar hogsheads and bags lay stored for months, not forty feet from people sick and dying of yellow fever. Is it not reasonable to suppose that the germs of the disease may, under such circumstances, cling to the casks or bags, and be taken on board of a vessel. My experience says they can, for many are the vessels which have lain in the harbor of Havana free from disease until they began to take on sugar.

Not all of the sugar store-houses, however, are so exposed to the virus of yellow fever, for some are situated so far away from centres of population, and their sanitary histories are so good, that they are above suspicion.

The leaves of tobacco inclosed in the dried spathe of the palm-tree are usually stored in the more central parts of the city, and may, in their dirty store-houses, become infected, or rather their palmy envelopes. There are some houses in Havana which, owing to their peculiar structure, do not admit of ventilation, and when once yellow fever has effected a lodgment deep in their innermost rooms, where a current of air never can circulate, as a small door is the only opening into their damp recesses, it stays and infects each new unprotected comer and his baggage. Baggage may come from any point of infection.

We have now seen that vessels may become infected in the harbor of Havana; that they may carry the infection; that they are usually infected at and near wharves, or near infected vessels in regard to locality; that under such circumstances they may become infected at any season of the year; that the crew may carry the disease abroad, and that to sugar, tobacco, and baggage the germs of the disease may adhere, and thus infect the crew and vessel.

We have also seen that vessels may enter the harbor of Havana at any season of the year, discharge their cargoes in the open bay, removed from any infected vessel, permitting none of their crew to go near the shore, and sail away uninfected and dangerous to no port that they may enter.

Every port and place within the domains of this great nation (the United States of America), is intensely interested in the prevention of the introduction of contagious and infectious diseases.

Havana, only ninety miles from its southernmost port, owing to the insanitary condition of her town and harbor, the peculiar construction of her buildings and wharves, the entire absence of effort to prevent the spread of infectious diseases by isolation or sequestration, and the lack of exertion to stamp them out, or some other cause, habitually has within her precincts two at least of these diseases, viz., yellow fever and small-pox. Between 800 and 1,000 vessels annually leave that port for those of the United States, exposing them to the introduction of yellow fever in a ratio ten times greater, probably, than that from all other places combined. Of this large number of vessels we know that about one in eight or ten had yellow fever occur on board while there. Can or has anything been done there to lessen the risk of introduction of that disease into this country? Little or nothing has been done by the authorities there, but it is believed that the National Board of Health has done much. It has tried, and I think successfully, to cause progressive infection to be "nipped in the bud" in Havana, by the

cleansing, purifying, and disinfection of vessels and their cargoes before they start on their eventful voyage. Vessels which have lain at wharves are cleansed and disinfected before they receive their cargo in the open bay. In other words, the wharf atmosphere is disposed of; if any suspicion attaches to the cargo, the vessel, with its contents, is again fumigated. If a vessel has had an infected neighbor, or if yellow fever occurs aboard from any cause, disinfection is practiced.

If a vessel has been at a wharf and is to go away empty, or takes on ballast, she and it are disinfected.

Disinfectants are used faithfully, thoroughly, with great strength, and always under the supervision of the Sanitary Inspector, that he may be able to certify as to what has been done, knowing well that disease germs pay little respect to mere forms. Among the disinfectants which I have found most useful and desirable may be mentioned sulphur, sulphate of iron, and carbolic acid (the last used more for its moral than its physical effect).

The last two are used in solution, in the strength of two pounds of the iron to a gallon and a half of water, and poured into the bilges, and all places where dirt and filthy liquids collect. From twenty-five to two hundred pounds are used in vessels, according to size.

The sulphur is of course used for the purpose of generating sulphurous acid gas by combustion, and is intended to disinfect the atmosphere of all apartments of the vessel, by employing about two pounds to every 1,000 cubic feet. From twenty-five to two hundred pounds are used on vessels, in proportion to their size.

The actual and complete combustion of the sulphur should be secured, and it should be done in a manner so as not to endanger the vessel's taking fire by the breaking of utensils, etc. To effect this, I am in the habit of using an apparatus consisting of three parts. First, is a broad, shallow iron pan, say three or four feet in diameter, which is set upon the deck and filled with water. Into this is set another and much deeper iron pan, about half the diameter of the former. Into the empty small pan is set a furnace with grates in the bottom, similar to those used in some places by washerwomen to burn coals for heating their irons.

The sulphur is put into the furnace and set on fire. A part of it burns in the furnace, and a part melts and runs down into the smaller pan, where it is consumed. Thus combustion is rendered complete in the two upper vessels, and the lower large pan, with its water, insures the vessel against fire in case of breakage, etc. Enough of these furnaces may be used to effect the disinfection of every apartment of the vessel, and an appropriate size of course can and should be selected.

In proof of the efficiency of the cleansing and the fumigation just noted, it affords me much gratification to state that where a vessel has been so treated, I have yet to learn of a single instance of the development of yellow fever aboard after she has left the port of Havana, when the crew had not been ashore for five days previous to the departure of the vessel. It is to be hoped that continued experiments and experience will justify us in the belief that a vessel can be prevented from carrying yellow fever into other ports from the infected one from which she sails.



A certificate, or bill of health, truthfully detailing all that has happened to a vessel in a foreign port, her movements there, what has been done to her and for her if infected, the sanitary status of her crew, the number that have been sick, and where, and of what — in short, all that can possibly be known of her — is fast becoming a necessity to the prevention of the introduction of contagious and infectious diseases, and to sanitary science. Health officers, the sanitary guardians of ports, are entitled to them, and commerce is entitled to them.

Mystery and the concealment of facts, or the perversion of truth, do immense harm to commerce. Let all the truth be known, and then a health officer will know how to act.

He will know what to do with the one infected vessel out of eight or ten which arrives at his port. He will then be able to establish an intelligent quarantine, founded on a knowledge of what dangers he is to apprehend. A few vessels may suffer more or less detention, but the great mass of commerce will be greatly benefited. The certificate, or bill of health, should be issued by some one who is responsible to the government to whose port the vessel is bound. As far as my observation goes, local Boards of Health are not to be relied on for the necessary facts for an intelligent bill of health, a certificate which conveys all the necessary information. The local Board is interested in the welfare of its port and not in that of the port to which the vessel is bound.

If health officers will impress upon captains and others the necessity and benefit of their demanding in foreign ports a bill of health embracing all the information alluded to, from the officers of their government, I am confident that much good may be done to shipping, and the risk of introducing infectious diseases be greatly diminished.

## XIX.

### MEMORANDUM OF PROBABLE CAUSE OF AN EPIDEMIC OF DIARRHŒAL DISEASES IN BUFFALO, N. Y., IN 1881.

By A. R. WRIGHT, M. D.,  
*Buffalo, N. Y.*

DURING the past season there has been a serious epidemic in Buffalo, so fatal in its effects that for two weeks in September the death rate was forty-nine and five one-hundredths per one thousand, instead of eighteen to twenty, our usual rate for that season of the year. We have had nothing approaching such a high rate since the cholera season of 1852. In seeking the cause of this alarming increase of mortality we found, first, that there had been but a light rainfall for July, August, and September, the two last months having altogether only two inches. This caused an extraordinary drought, and those parts of the city which depend on surface drainage and shallow wells had their water supply much less diluted than usual, the drippings from the surface forming a prominent part. Again, the Health Officer's report shows that nearly all the increase in mortality was from diarrhœal diseases, prevailing mostly in districts of the city where the water supply is from surface wells almost exclusively.

But to get definite and instructive figures we obtained the location of most of the public wells, and also an approximation of the relative number of families using pure Niagara water and well water. The appended table gives as much of these results as we need for our present purpose. On referring to it we find as follows. (We use round numbers for general effect, and call Wards V., VI., and VII., the infected district, and Wards II. and IV. healthy.) First, That for the period indicated, viz.: August 27 to October 8, there were in the infected district two hundred and ten deaths from diarrhœal diseases, or three and one third to each one thousand of population, while in the healthy district there were for the same period and same cause eleven deaths or eleven sixteenths of one to the one thousand of population, showing that in the infected district the mortality from diarrhœal diseases was about five times that of the healthy district. Let us compare the sanitary conditions of the two districts. In the infected there are on an average about thirteen persons to the acre, and generally each family occupies a small house. In the healthy district, fifty-five and one half persons to the acre, and many of them living in tenement houses. This comparison favors the infected district. Let us see what is unfavorable in its sanitary condition. It has surface drainage and privy vaults in back yards generally, and has ninety-five shallow wells which furnish nearly all the water used for table purposes, while the healthy district has good sewerage and drainage,

water closets in houses generally, and has sixteen wells which are but little used, as the Water Superintendent roughly estimates that the supply of Niagara water in the infected and healthy districts is as one to eight.

Again, the sub-soil being stiff clay, the surface drainage from houses, stables, and shallow privy vaults, must inevitably find its way into the wells.

From these stubborn facts we may safely draw the inference that the quintuple mortality of the infected district is caused by the well water polluted from surface drainage. Moreover, the First Ward of the city, inhabited by Irish and Polish laborers generally, with streets and houses in a very uncleanly condition, but having good sewerage and a good supply of pure Niagara water, has only one seventh of the diarrhœal death rate of the infected district. The inevitable verdict should be that those public wells suffer the death of the first martyr.

No. of Ward.	DEATHS FROM DIARRHŒAL DISEASES.							Popula- tion of Ward.	Persons per acre.	No. of Wells in Ward.
	Week ending Aug. 27.	Sept. 3.	Sept. 10.	Sept. 17.	Sept. 24.	Oct. 1.	Oct. 8.			
I.	4	2	2	0	2	1	1	14,974	20	20
II.	1	0	0	0	0	1	1	6,970	56	} 16
IV.	2	1	2	1	1	1	0	8,932	55	
V. }									10	} 95
VI. }	21	32	39	43	27	32	16	63,126	14	
VII. }									14	
Total in city .	45	47	60	55	38	40	27	155,159		

Niagara water supply has been shown by analysis to be very pure and healthy.



## XX.

### THE ATMOSPHERIC ELEMENT IN EPIDEMICS, AND ITS POSSIBLE CONTROL.

BY PROFESSOR T. C. DUNCAN, M. D.,

*Chicago.*

THAT "coming events cast their shadows before," is a settled belief of epidemiologists. Dr. Southwood Smith, in "Nature of Epidemics," records the fact that severe epidemics have been preceded by "long-continued droughts succeeded by torrents of rain, forming excessive dampness under the influence of which spring up inordinate growths, producing moldiness, and the blue spots and other colored vegetation that adhere to houses, furniture, clothing, persons, etc., fostered by a steady elevated temperature." "Epidemics," says he, "give distinct and unmistakable warnings of their approach. These consist of two events: first, the sudden outbreak and general spread of some milder epidemic; and secondly, the transformation of ordinary diseases into diseases of a new type, more or less resembling the character of the extraordinary disease at hand."<sup>1</sup>

Dr. Smith records such a change in the type of the fevers in the London Fever Hospital *six* months before the first visitation of cholera in 1831.

Dr. Shipman, of Chicago, reports<sup>2</sup> that *eight* months before the appearance of cholera in Chicago in 1853, nearly every case of disease was complicated by a diarrhœa.

In reference to the time that the preceding warning has been noted, Dr. Heimen says, that "for four or five years preceding (1831) that which the plague raged in Malta, sudden deaths (apoplexies, etc.) were more frequent than ordinarily, and during the twelve months immediately preceding, and especially the last month of the period, the increase was still more, inasmuch as to excite public observation."<sup>3</sup>

"Six months before the cholera epidemic (in 1831) fever became a disease of debility; up to 1855 this character of fever had never disappeared."<sup>4</sup>

Dr. J. Buchner, of Munich, says: "Fibrinosis of the blood has disappeared more and more since 1827, and this is why cholera has traveled repeatedly so easily all through Europe; as soon as fibrinous diseases regain the ascendancy, the albuminous cholera will disappear."<sup>5</sup>

The "blue mist" present during a cholera epidemic was observed before and during the epidemic that prevailed in this city (Chicago) in 1866. When the atmosphere cleared the disease disappeared.

<sup>1</sup> *Nature of Epidemics*, p. 5.

<sup>2</sup> *Med. Jurist*.

<sup>3</sup> *Cyclopædia of Practical Medicine*, vol. xi., p. 68.

<sup>4</sup> *Nature of Epidemics*, p. 7.

<sup>5</sup> *All. Hom. Zeitung*.

We are informed that a dense cloudy atmosphere overhung the city of Memphis in 1873 during the prevalence of cholera, and a similar atmospheric condition prevailed during the recent yellow fever scourge.

Dr. Baer, of Richmond, Ind., a veteran observer for the Smithsonian Institute, associates the prevalence of storms from the east (over his locality) with the approach of epidemics.

If the above are facts they deserve our most thoughtful attention, especially if we associate with them the idea of Dr. Lamson, of London, that epidemics follow each other round the globe in regular succession, as "a pandemic wave." The eastward march of diphtheria would seem to be an exception to this rule. The westward march of both the plague and cholera would certainly give color to the fact of a peculiar atmospheric condition prevalent at certain times. (1.) What is the nature of this atmospheric condition, and (2) can it be controled, are practical sanitary problems.

We will glance briefly at the composition of the atmosphere and the character of its usual contaminations.

The atmosphere is composed of about four fifths nitrogen and one fifth oxygen, and a small per cent. of carbonic acid and other gases, organic matter and water. The atmosphere is the receptacle of all the gases and vapors, organic and inorganic, which are constantly arising from the earth. Notwithstanding the fact that our atmosphere is forty-five miles deep, still so dense is the lower strata that one half is computed to be within three miles of the surface of the earth.

This density varies, we know, with altitude as well as with the condition of the sky and the seasons. It is increased during stormy weather, and especially when storms are "backing." I have observed many cases of convulsions in sensitive children during "gathering storms." Winds also have a marked influence on the atmospheric state and pressure. The electrical condition is influenced both by the cloud, moisture, light, and wind. When the sky is overcast for any length of time, the electro-negative condition that envelopes us is most deleterious to health, and renders the human body less liable to resist disease. A marked electro-negative condition of the atmosphere, and the presence of cyanogen, have been ascertained during an epidemic of cholera in Germany.<sup>1</sup>

Whatever may be the deleterious elements added to the atmosphere, they must arise chiefly from the earth, and are therefore under sanitary control.<sup>2</sup>

The two stable gases that make up the bulk of the air, *i. e.*, nitrogen and oxygen, are constantly undergoing change. The active agent in this work is water. Water is constantly arising and undergoing decomposition in the air. The product is ozone ( $O_3$ ), nitric acid ( $NO_3$ ), and ammonia ( $NH_3$ ). The former rises, while the two latter fall, bringing with them precipitation or rainfall.<sup>3</sup>

<sup>1</sup> *Med. Investigator.*

<sup>2</sup> The nature, source, and amount of cosmic dust that is falling upon this earth in large quantities, should not be forgotten in this connection.

<sup>3</sup> During this descent chemical change doubtless goes on and hydrogen is liberated, and rising rapidly by its velocity of diffusion, robs the ozone, and oxygen and water is again formed, and that high in the air.

That heat is a most important factor in the production of epidemics, is evident from the fact that cholera, plague, etc., originate, in India, where the atmospheric lens concentrates the sun's rays upon the torrid region off the Ganges.

Heat favors the rapid rising of the carbonic oxide and other deleterious organic gases; chiefly the light carbureted hydrogen ( $\text{CH}_4$ ), olefiant gas ( $\text{C}_2\text{H}_2$ ), sulph. hyd. ( $\text{HS}$ ), proto-nitrogen ( $\text{NO}$ ), carbonic acid ( $\text{CO}_2$ ), etc. These held near to the surface by overhanging clouds would poison the system sufficiently to give rise to disease. Malaria is supposed to be carbureted hydrogen. With one exception, perhaps, the above gases are depressing in their action upon the system, and not inflammatory, as are the products of aqueous transformation.

With carbon and nitrogen, heat and organic matter, it is possible that deadly cyanogen ( $\text{NC}_2$ ), is also generated among that company of deadly gases. The similarity of an attack of cholera morbus induced by eating green corn, which is composed chiefly of nitrogenous and carbonaceous elements, would lead us to give those elements a prominent place in the genesis of cholera, either in the epidemic, endemic, or sporadic form.

Now if the long seasons of rain, following droughts, are succeeded by a vigorous growth of vegetation, which in turn decays and fills the air with organic matter, and then this kept near the surface of the earth by an overcast sky; if these are the conditions of the environment upon which epidemics of cholera, plague, etc., depend, then the question of control would seem one largely of ventilation. In other words, rarefying the lower dense air and at the same time getting rid of the decomposing organic matter in the air. How can this flushing be effected?

The methods that have been resorted to are concussion, heat, and chemical agents, on a more or less extensive scale.

The plague of the Middle Ages was said to have been arrested by the extensive conflagration that nearly consumed London. Perhaps as much by purifying the atmosphere as in consuming the filthy dwellings of the plague-stricken people.

The protective power of copper and sulphur against cholera, and of charcoal against yellow fever, would suggest a different means of dealing with each epidemic disease.

Concussions of the air by means of explosions of gunpowder, firing of cannon, or the discharge of large quantities of nitro-glycerine, have been suggested as a method of purifying the air. This would doubtless favor precipitation, but it is questionable if that is not often the very thing to avoid. The electric changes set up by this method would doubtless aid the object sought. The generation of large quantities of ozone by the union of sulphuric acid to permanganate of potash, would by its rapidly oxidizing action clear the lower air most speedily of the deleterious organic matter. It would also create a vigorous upward current, and thus ventilate as well as disinfect the lower air. It is doubtless the best agent we possess for the purpose, but the chief obstacle to its extensive use is its great cost if used in large quantities. For dwelling-houses and badly infected localities, it is the agent of all others to use.



The power of sulphur as a germicide, as well as to hasten chemical change, would make it one of the best agents for individual protection.

But the best and most available means for ventilating the contaminated air, especially of extensive regions and that enveloping large towns, is the resort to large fires. The rapid currents and rarefaction that fires give rise to make them of the utmost value in the prevention and arrest of epidemics.

The addition of sulphur to the flames would increase the disinfective power. For the arrest of a cholera epidemic this would be the best, as well as most available method.

In the use of bonfires for the purpose of changing the peculiar atmospheric condition attendant upon epidemics, a suggestion as to their location and number might not be amiss. A fire creates a current upward from the fire and horizontal toward the fire. During the great fire in Chicago the current toward the fire near the ground was so strong as almost to take one off his feet, even to leeward of the prevailing wind.

If there is any local current, as up a river, then the fire should be on the opposite bank of the stream, so as to draw the foul lower air away from the city to be ventilated. One large bonfire would be better than several. Cross-currents would give us a chopped atmospheric sea, and hinder rather than favor atmospheric ventilation. Small fires on the opposite side of a city (or in the streets), upon which sulphur should be thrown, would send currents among the buildings toward the big fire and thus hasten the disinfection desired.

Flushing the streets at the same time would aid to clear the surface from decomposing organic matter, while at the same time in the sewers would be created currents that would aid the general aerial ventilation.

If it is a fact that there is a peculiar atmospheric condition that precedes and accompanies epidemics, we should know what it is, and bend our energies to put the air in proper order, as we now endeavor to clean our streets and purify our dwellings. Aerial disinfection is among the possibilities.

The general prevalence of storms during the past months, and the westward march of cholera in Europe, would suggest aerial ventilation as a practical question for the consideration of this Public Health Association.

## XXI.

### RAILROAD SANITATION, ITS OBJECTS AND ADVANTAGES.

By S. S. HERRICK, M. D.,

*New Orleans, La.*

#### A. — ITS OBJECTS.

THE following are conceived to be appropriate objects for a railway sanitary system :

1. A surgical and medical service, designed for the relief of sufferers (passengers and employees) from the casualties of travel upon the lines, for affording medical attendance in ordinary diseases contracted by employees, and for superintending their personal hygiene.

2. Physical examination of those engaged in the movement of trains, with reference to defects of sight and hearing and diseases of the heart, lungs, and great blood-vessels, as a prerequisite to their employment.

3. Inspection of the sanitary condition of passenger coaches, of grounds and buildings, and recommendation of improvements wherever needed. As occasion presents, counsel in selection of sites and in the construction of works and buildings.

4. A meteorological service affiliated, if practicable, with the National Signal Service.

5. To guard against danger of infecting railroad coaches, stock, and goods cars, by transportation of diseased persons or animals, or of infected personal baggage or merchandise, against danger of conveying contagion from one point to others, and against injury to stock in transitu from overcrowding, long confinement, and deprivation of food and water.

6. To confer with National, State, and local sanitary authorities, with the view of obviating or moderating restrictions on travel and traffic, and to represent the company in sanitary and quarantine consultations wherever its interests may be affected.

#### B. — ITS ADVANTAGES.

1. Relief to the victims of railway accidents is generally recognized by the managers as a measure of policy as well as justice, and many of the most important companies have made arrangements for carrying out this purpose. It is hardly necessary to say that the whole relief service of a company should be under the superintendence of a single medical head, for the purpose of securing uniformity and efficiency of action and economy in cost.

There is good reason to believe that a system of medical attendance upon

employees could be so organized and administered as to conduce materially to the advantage of both the men and the corporations employing them ; and it is announced that the Chicago, Burlington, and Quincy Railroad Company is now about to establish a hospital at Aurora, Ill., with this view. The merchant marine of the United States has a system, for many years in successful operation, which is of incalculable benefit to mariners, and is self-supporting from a tax of forty cents a month upon all who are entitled to its benefits. This is a model worthy of imitation.

It is undeniable that the efficiency of men in any organization is in direct relation to continuity of action. Interruptions by sickness are among the most common and the most serious disturbing causes. To reduce these to a minimum and to secure with the least possible delay the return of trained employees to their familiar duties, is an object of great importance. The certainty of having medical relief within reach at all times would operate powerfully in producing contentment and regular continuance in their occupations.

In large cities established general hospitals would be available for this kind of relief, as well as for the surgical casualties before mentioned, but the individuals there treated for the railroad companies should be under supervision of their own medical officers, to prevent abuse of privilege and secure the best attendance. At other points suitable infirmaries should be established and placed in charge of local practitioners, employed by special contract for specified duties. These would be stationed at the terminus of roads and at the intermediate points where workshops are located and the crews of trains reside. No compulsory hospital fee need be imposed. The advantage of the system would be sufficient inducement for its voluntary adoption by the men, and it would naturally be extended so as to include their families in its scope and to give them attendance at home.

But we must not lose sight of prevention, which is proverbially of manifold value above the cure of disease. The single example of malaria, so prevalent throughout the greater part of our country, so mighty a destroyer of life, and so potent a disturber of man's industries, affords a boundless scope for the exercise of personal prophylaxis, under medical supervision. The crews of night trains are especially liable to malarial affections, which might be mostly prevented by suitable regulations, including the proper preventive remedies. It is obvious, indeed, that precautionary measures, under medical superintendence, could advantageously be used to guard against the whole list of preventable disease. Besides there would be great gain in early treatment of ordinary ailments, which would be encouraged by placing facilities within the reach of all.

The medical adviser would also, as far as practicable, protect men, while on the route, against prolonged fasting and deprivation of sleep, against unnecessary exposure to cold and storm, and secure for them wholesome food and water.<sup>1</sup>

<sup>1</sup> It is not unusual, during a busy season, for the crews of freight trains to be kept on duty for thirty-six hours or more, without opportunity for sleep. This is not only a wrong to the men, but it endangers trains very seriously. I have the recent testimony of an intelli-



It might be supposed that the instinct of self-preservation on the part of men, aided by the good sense of managers, would clearly lead to suitable hygienic measures; but the same supposition applies to people of all classes and occupations, while sanitarians are convinced that at least one half of the ailments of mankind in civilized life are strictly preventable. It is generally agreed that private individuals and corporations are more successful than government in the execution of important works with dispatch and economy; but the government shows more wisdom in caring for the lives and health of its servants, both in curing and in preventing disease.

2. We have just seen that neither employees nor employers recognize the value of personal hygiene for the avoidance of preventable diseases; but it might rationally be supposed that the former would not willingly risk their lives, nor the latter the lives and property of their patrons, as well as their own property, on railroad trains with blind men in charge. Yet this risk is actually run, and we know not how often, on most of the railroads of this country. Observation has proved that about four per cent. of men are incapable of distinguishing between the colors used for signals; and a still larger proportion cannot recognize objects far enough to stop a train in time to escape danger. Under certain circumstances these men are practically blind, and occasions come when disaster ensues.<sup>1</sup>

It is hardly necessary to mention here that an act of Congress requires all pilots of steam vessels carrying the American flag at sea and those navigating the waters of the United States, to pass an examination testing their color sense and visual acuteness; and that the Legislatures of Connecticut and Massachusetts have made the same requirement of railroad engineers, firemen, conductors, and signal men. It is probable that similar provisions will be enacted in other States at no distant day, unless railroad companies forestall action by voluntary adoption of an efficient system carried out by their own medical officers. Indeed, there is good evidence that this will gradually or rapidly become an established fact upon the most important roads, since it has already gone into effect upon a number; for instance, the Pennsylvania Railroad and others leading out of Philadelphia, the Illinois Central, etc.

The Board of Railroad Commissioners in Massachusetts reported in 1880 that such examinations are practiced generally on the railroads of England, France, Germany, Italy, and Sweden, although not required by law; while they are so required in Holland. It thus appears that the railroad companies in the most enlightened countries of Europe have rendered legislation on this subject unnecessary.

At the present time the most important question at issue is whether these gent engineer, that he had lighted a cigarette to keep himself awake at his protracted task, and woke to find his clothing on fire from the cigarette which had dropped from his lips while he was overcome by sleep.

<sup>1</sup> Investigation of railroad accidents with reference to color-blindness as the responsible cause are too recent and too few to speak positively. It is known that individuals laboring under this defect learn to distinguish signal lanterns imperfectly by difference in intensity of light; but they are liable to be at fault when the wick is turned a little lower than usual, or when the light is obscured by mists and storms of snow or rain.

examinations may be made by laymen, officers of the companies, or whether they should be made exclusively by medical men or experts. The Massachusetts Railroad Commissioners hold that the former are competent ; but this is controverted by the experts appointed by the Connecticut Board of Health to enforce the legislative act of that State. Thus Prof. W. H. Cormalt, M. D., of Yale College, one of the examiners for Connecticut, testifies that experience has taught him his former error in supposing that laymen might make the examinations. He found that the reports of railroad superintendents and others who had made examinations were often incorrect, the tests being applied either superficially or in ignorance of the subject ; for instance, they failed to distinguish between true color blindness (a fatal defect) and color stupidity (simple ignorance of the names of colors). Besides, cataract in any degree is a fatal defect, but one which a layman is incompetent to detect in an early stage. In short, a medical examination is needed for the protection of the men as well as that of the public.

Again, men occupying positions vital to the safety of railroad trains might suddenly be stricken down at the post of duty through some organic defect of the heart, or aneurism of a large artery, or pulmonary hemorrhage, which would surely be anticipated by a careful medical examination, but not otherwise. Deafness, too, would be a disqualification, but a layman should not be expected nor required to define the boundary between admission and rejection or to apply the test.

It appears from the testimony of Professor Cormalt that the principle of "natural selection" soon eliminates railroad engineers laboring under serious visual defects, for, out of seven rejected by him for color blindness, he found only one who was over thirty-two years old ; the average age being twenty-six and a half years. These, like their elder compeers, would be condemned eventually as incorrigibly unlucky, but, perhaps, at frightful cost of life and property.

Another important consideration is that accidents traceable to such physical defects of employees, as could be detected by medical examination, would certainly place the company at fault and responsible for damages to person as well as property ; while, on the other hand, the absence of such defects would go far in exoneration from such responsibility. Moreover, in case palpable physical defects be proved, claim for exemplary damages would be made, and probably allowed.

3. If it be admitted that the personal hygiene of railroad employees is a matter of any importance to the company, it follows that the advice of a sanitarian would be valuable in relation to passenger cars, to buildings and grounds, and in the selection of sites and the erection of works and buildings. It is not supposed that practical railroad managers regard disease as a special dispensation of Providence, when they build without due regard to drainage, removal of excreta, or proximity to marshes. These and other similar blunders simply indicate neglect to secure suitable sanitary advice, and not a spirit of fatalism ; but the same managers are careful to have the services of competent mechanical engineers and builders. The time is happily past when sanitation can be stigmatized as a profane scheme to defeat

divine Providence ; let us hope that corporations may soon cease to count it a fruitful tax on their revenues. "Public health is public wealth" has sometimes been repeated for an axiom, and corporations aim at securing a share of the public wealth ; can they therefore either justly or safely disregard the public health ?

4. For some years the national government has sustained a meteorological service, for the benefit of the agricultural and commercial interests. These are the very interests which support railroads, and it is plainly an advantage to the companies to coöperate with and extend this service, both to enable them to guard their own property from damage by storms, and for the benefit of agriculturists who give them business. The cost would be trivial, for the observations could be made and forwarded by telegraph operators ; and it is not impossible that the necessary instruments would be furnished by the government. The affiliation of this branch of railroad sanitation with the National Signal Service would be so manifestly advantageous to all concerned, that it could not fail of adoption.

5. Railroad companies are constantly liable to receive persons and animals affected with contagious diseases for transportation in their cars, and no one would assert that it is proper to admit them. It is too much to expect that the ordinary officers of a company could be depended on to recognize and ward off all danger of this kind. Some advantage might be derived from printed rules, prepared by a professional man, but instances would arise calling for a medical diagnosis ; and then a physician's certificate should be obtained to settle the doubts of a station agent or a train conductor, before admitting a suspected person on the train. As animals are generally shipped only at a few important stations, it would be easy to have the herds inspected by an expert beforehand.

It is beyond question that many animals are destroyed and many more injured during transportation by overcrowding and by confinement too long without food and water. Strict rules should be framed to govern this kind of traffic, and nothing short of special supervision can secure their enforcement. Safety requires that this supervision should be exercised from a sanitary standpoint, and so often that its influence may never be wanting.

6. The experience of the yellow fever epidemic of 1878 taught the managers of railroads running out of New Orleans particularly the usefulness of medical officers in their service during actual or threatened pestilence. The judicious efforts of sanitarians in 1879 prevented a general resort to the shot-gun quarantines which characterized the year 1878. Had there been a sanitary organization in 1878 upon the railroads, it is certain that they would have been spared much pecuniary loss, and the people along their lines much needless alarm and deprivation of the comforts of life.

In the presence of danger from pestilence people look to their physicians. The medical adviser of a railroad company can come to a rational and probably satisfactory understanding with his professional brethren ; and, if the people are distrustful, he can bring medical men to meet them whom they will trust.

Occasions arise when legislation or discussions of questions in medical



or other bodies affect the sanitary and material interest of railroads, and when their accredited medical representatives might be of great benefit. Their value would be most appreciated in their absence, as with life-preservers in a shipwreck.

But whatever advantage might be claimed for railroad sanitation, either to the public or to the companies, the question of its adoption by any management will turn upon its probable financial success. It seems to be generally agreed that any system of relief maintained by a railroad company is better than to let the victims of accidents shift for themselves and look for reimbursement in the courts. To put the service directly under the general management would be like leaving the workshops or the operation of the road without separate supervision. The superintendence is an expense, but it is not presumed that men are the best judges of what they are to do at a particular time, though they may know how to do it.

As to physical defects, there can be little doubt that it will cost a company more to find them out by a series of accidents than to pay a medical man to discover them before the men are trusted with lives and property.

In fact every feature of this service is designed to secure the company against pecuniary losses. 1. By reducing the cost of actual disasters to the lowest amount. 2. By adopting precautions to obviate disasters. 3. By preserving the health and securing the efficiency of employees. By avoiding the stigma of common carriers of contagion and destroyers of live stock, with its incidental losses. 5. By obviating interruption of business through quarantine obstructions and expensive lawsuits for damages to person and property. It has, therefore, the essential nature of insurance, with the substitution of the element of prevention in place of reimbursement. What a gain would it be to fire and marine insurance if this substitution could be achieved by any system capable of formulation.

A few remarks upon the *personnel* of a railroad sanitary service might here be appropriate. Suppose one thousand miles of single-track road to be under the same general management, one medical man should be capable of exercising sanitary superintendence over the whole. But it is to be understood that he must renounce private practice and every other occupation except this duty. Then there should be a district surgeon at every point where the crews of trains shift. The workshops would naturally fall into this arrangement. District surgeons would attend the hospitals and be sent for in case of accidents within their own or adjoining districts. These surgeons might attend to private practice. Their compensation from the company would be according to a settled tariff for surgical cases. Hospital service and the medical attendance of employees and their families might be at a fixed salary.

Examinations for physical condition of employees would be made and carefully recorded by the chief surgeon, and he would also be the inspector of hospitals and all wounded persons. At every point where cattle in large numbers are shipped, there must be an inspector of stock (a physician or veterinarian) to see that no diseased animals are admitted, and the rules enforced relative to overcrowding, etc.

In addition to the above, it might be expedient to make arrangements with local physicians at all important stations along the lines to render service, in case of accidents, at fixed rates of compensation.

I cannot doubt that such a sanitary organization would conduce to the common benefit of companies and employees ; to the latter by contributing to their health and comfort ; to the former, by diminishing interruptions and derangements in their operations, while their mutual relations would become more harmonious and friendly. In like manner its influence would be salutary, as affecting the relations of the company with the public. Notwithstanding the proverbial recklessness of the average American traveler touching his personal safety, there is a large fraction who value security from preventable accidents and diseases, and would manifest preference for a management where this consideration is recognized. They are the most intelligent and influential portion of the public, and the best patrons of transportation companies. In the rivalry of numerous and competing routes managers are wont to boast of the advantages which they offer in respect to economy, speed, comfort, and even safety. Liberal expenditures are made to promote speed and comfort, in the confident expectation that they will be returned in augmented business receipts.

It is certain that much might be done for promoting safety in the manner herein indicated, and that the public might be invited to appreciate the offer through the usual advertising mediums. There is good reason to presume that many would be sensible to such an inducement and give preference to the safer pathway. Thus the premium on the insurance would be returned, and the saving of life and health would be clear gain.

## XXII.

### THE CONTROL OF DEFECTIVE VISION ON LAND AND SEA.

By B. JOY JEFFRIES, M. D.,

*Boston, Mass.*

WHAT I have to say is in confirmation of what we have heard from Dr. Herrick, but fortunately we shall not overlap each other. My medical brethren will excuse me if something of what I say is A B C to them. I must build up my points from the bottom. We are apt to forget the eye has two senses, those of form and color. We are quite familiar with the sense of form, but we seldom disassociate it from the sense of color.

[Dr. Jeffries here drew an eye on the board, and by illustrations showed the value of color over forms for signals; also, with reference to color sense, that one might be partially color blind, *i. e.*, as to certain colors. On a white surface he then placed a small black square. Over this was laid a circular piece of paste-board about six inches in diameter, one side of which was green and the other red, and in the centre of which was a black square, the same size as the one on the chart. The audience were asked to look at the black spot on the green side until the lecturer counted twenty, it was then withdrawn, and the impression left was that they had been looking at a red disk, and *vice versa*. He stated that the three primary colors were not blue, yellow, and red, but red, green, and violet, and then described the different kinds of color-blindness.]

The study of color is a new thing. It is only within less than ten years that the question of the sensation of color has been taken up to the present extent.

Now as to color-blindness. You will ask me at once what it is. It is a most difficult thing to describe. If I should talk an hour I might tire out myself and the audience, and then not be understood. The nearest I can explain is that the color-blind see the colors they are blind to, viz., red and green, or violet and yellow—as gray, *i. e.*, no color. All of their false colors in a pigment renders it muddy or grayish. Now how many people are color-blind? Four per cent. of males. We have the results of at least 150,000 examinations. I have followed up the question of testing myself pretty steadily, and I will give you the results. I have tested 18,754. I will add to that 274 boys of the High School here yesterday, and 73 of this Association. In 18,754 I found 777 color-blind. Amongst the boys the enormous percentage of 22 out of 274. Of the 73 gentlemen of the Association only two turned out to be defective. How is it with the other sex? I supposed their familiarity with color would somewhat conceal their color-



blindness, but if any one went to work in a proper way it could be detected. I have been driven from this theory. I have tested 14,633 females, and found only 11 color-blind. Of the 91 girls at the Chatham Academy here I found none, and of the seven ladies of the Association none. You see it is extremely rare. It has nothing to do with their familiarity with colors. Color blindness is congenital. One is born with it and dies with it. It occurs in both eyes, or it may only occur in one. It is not the effect of race. From the north pole to the equator have people been examined, and the same old story found. It is not the effect of age — children are born so. It has nothing to do with color. Colored people have been examined, and the same proportion holds good as among the whites. It has nothing to do with civilization. The most uncivilized tribes have been examined, and found to be defective in their vision. It has nothing to do with education; the most educated and the least are affected. It has nothing to do with familiarity with colors. A person may remain among colors all his life and still be color-blind. It is hereditary; peculiarly so. A man who is color-blind has three boys and two girls. All these escape. Neither boys nor girls are color-blind, but if the girls marry and have boys, *they* will be color-blind. It is generally transmitted through the females who escape, but not always. There is a record of several generations of females in Switzerland where color-blindness was handed down to the females through the females.

It is incurable. Nothing has any effect on it except one peculiar thing. Those people who can be put into a hypnotic or mesmeric condition can be made to distinguish colors whilst in this state. And the normal-eyed who can be put into the hypnotic condition become temporarily color-blind.

It can only be palliated, not cured. [The lecturer here, by illustrations, showed how, to a certain extent, color-blindness could be palliated, by artificial light, when the color-blind do not make such gross mistakes; also, by looking through a pale lemon-colored piece of glass. He also showed a wedge-shaped little glass tank filled with a solution of fuchsine, one of the red aniline colors. It was even proposed to use this on the Belgian railroads. It was once represented as a perfect cure for color-blindness; he said such a statement was absurd.] Color-blindness can be acquired. It is associated with certain diseases, and may be caused by injury to the head, etc. It readily escapes detection. It seems to me almost as if everybody I knew was color-blind. My friends, class-mates, and professional brethren one after another come to me and I find they are color-blind. One gentleman, I remember, who was associated with me in reference to a question where color came in, was found to be so color-blind that he wore a brilliant red cravat, supposing it to be a steel-gray. I could fill up a whole evening in reciting the curious mistakes of the color-blind. But it is a more serious matter.

We have found a means of detecting the color-blind, and it is a ready method. Those of you at the Academy yesterday saw that between ten and two o'clock I tested two hundred and seventy-four boys and ninety-one girls. You see the objection made on the part of the railroads that the

men cannot be let off their work long enough falls to the ground. The danger is now recognized. Laws have been made on the other side of the water, and also on this side, and laws are being prepared. I might show you a pretty series of experiments here, if this was not an artificial light, with reference to the different methods of testing. [The lecturer then gave some few illustrations as to means of testing, and stated that asking names of colors was of no use whatever.]

There are no tests of any value except by comparison. How can I find out how a color affects the brain of a given person? By asking him? That will not do it. What other method can I use? I will lay down certain colors on the table and ask him to pick out those which to his eye look alike. Probably the first one he picks out settles his case.

[The speaker then described two methods of comparison, — Holmgren's and Stilling's, — because they were spoken of and recommended for national governments and railroad corporations throughout the world by the International Medical Association, which met in London, August, 1881.]

The best test is that which you have already seen me use here in the hall. [The lecturer still further illustrated by his worsteds. He also stated he had, by request of the American Ophthalmological Society, arranged with Mr. Whitney, worsted dealer, 129 Tremont Street, Boston, Mass., to supply full sets of worsteds, including the tests. They are exactly what the lecturer showed, being the same as used by the United States Army, Navy, and Marine Hospital Service.]

The first point is to find out whether a person is color-blind, and the next point what form of color-blindness he has. Mr. Whittier, the poet, is totally green-blind. I asked him how he managed to write as he did. He said he hardly knew himself, but supposed he got his ideas of color from what people said. He has, in addition, the power of seeing yellow and blue as we do. In Connecticut the politicians have done away with the laws in regard to color-blindness. Both political parties were fighting to see which would get the vote of the railroad employees.

This method of testing by the worsteds can be used without a person knowing the name of a single color. I have tested deaf mutes who could understand only by a motion. A person found color-blind by this method will be found so by all others. Every man who makes a mistake with his worsteds will fail on his lanterns and flags at twelve hundred or fifteen hundred feet. Another point. If a person is only a little color-blind he can take care of some small place. He may tend a gate, for instance. [The speaker then gave illustrations as to how to test the amount of color-blindness, showing also the apparatus introduced and used on the railroads in Holland, and recommended by the Connecticut State Board of Health in the examination of men. He also illustrated how natural it was for persons not experts to make mistakes in testing railroad employees, and showed an improved class of signals; also, a standard red and green glass supplied by the New England Glass Works, Boston, and now adopted by the Treasury Department to be required on steam vessels.] It has not been adopted by the Navy Department yet. Very likely it will be in due time. This

glass was only made by persistent effort on my part to get glass manufacturers interested in it. Finally I have got them pecuniarily interested in it, and they have at last made a glass which is a most perfect green. The red used is what is called a ruby red. These colors are much better than what are generally used on the railroads.

You will see that the examinations required in this work must be done by experts. They cannot be made by the laity. The army requires examinations for the signal corps, the navy entirely, and the marine hospital for pilots only. One hundred and sixteen pilots were thrown out for color-blindness in 1881. There is no required examination in the merchant service.

I have proposed, and it has been seconded by a large number of scientific men in the country, that our government should institute an international commission of naval officers and experts, who should meet together, from all the different countries, and agree upon standard methods of examination, and what should be considered as a fair amount of sight for men to have. The petition went to the last Congress, was referred to the Naval Committee, who unanimously reported a bill for such a commission, which was not reached when Congress adjourned. It comes up again in the new Congress, and I would ask the coöperation of members who have acquaintances at Washington, to interest them in that bill. I am sure if this Congress goes by without this bill being passed, our English friends will take it up and get the honor.

Now, what will it do? If you go through the Mediterranean you will not see one vessel in five that has a side light. How often you hear the lights were not lighted. The International Commission will give importance to the necessity of government regulations for carrying side lights. Beyond all that this Commission will call attention to the necessity of examination in the merchant marine. If a captain wants his men examined, and the men are willing, the examination will be made by the Marine Hospital surgeons. The only captain I ever heard of who tried to have it done told me that nine out of ten of his men were thrown out by the surgeon as diseased. The result of attempting an examination of seamen was that his life was in danger from the boarding-house runners, who threatened to kill him. Surgeon-General Hamilton, of the Marine Hospital Service, has repeatedly explained the whole in his annual reports, and shown that compulsory examination of seamen by act of Congress would break up the present nefarious system of blood-money, and soon make the position of a sailor a desirable one for our young men.

This plan for an International Commission has received general support. I trust this Association will be willing to pass a vote in favor of it, and urging Congress to act favorably in the matter.

One word more and I am done. The normal color sense cannot be altered, but it can be cultivated. [The lecturer then showed Dr. Magnus's color chart, to be used in the kindergarten and primary teaching, and illustrated how the children were familiarized with colors and taught color names, etc.] In this way boys who are not color-blind will grow up to know



the colors as well as the girls, besides, those who *are* color-blind will be found out. What is the use of it? I found in the academy here two sons of a pilot, both color-blind. If they had not been detected they perhaps would have followed their father's profession, and be thrown out by the United States laws now governing pilots. In this way the color-blind are weeded out from posts of danger. The boys are warned and the parents are warned, and they will not turn to professions where it is necessary to be free from this blindness.

I hope I have shown to those present that color-blindness is a reality, it is dangerous, it can be detected only by an expert, and that legislation is needed to protect the community.

In closing I would thank the Association for the privilege they have given me of speaking beyond the time allowed, and as I leave immediately for my home in the North I would thank those I have met here for many pleasant recollections.

## XXIII.

### EFFECTS OF TOBACCO ON YOUTHS.

By A. C. GORGAS, M. D.,

*Medical Inspector, United States Navy.*

THE use of tobacco by the Cadets at the Naval Academy has been for many years a subject of interest and of discussion both to commanding and to sanitary officers.

Both classes of officers have recognized and conceded that the consequences have been subversive to discipline, and injurious to health.

But a difference of opinion has been held in regard to the propriety of forbidding it by regulation; and great difficulty has been encountered in showing clearly, what every one was prepared to believe, in what way its ill effects upon health were manifested.

And the evasions of the regulations and orders of prohibition have been so frequent in the past, and so much additional police trouble has been caused in their enforcement, that without some showing of the hygienic necessity of prohibition, it was considered by some officers better to relax discipline and permit its use, than to create an additional misdemeanor by forbidding it.

In the absence of statistics no positive proof could be adduced to show the evils of the tobacco habit upon growing youths. Many of the trivial diseases so called, such as headaches, disordered digestion, *malaise*, suspected to be due to indulgence, sometimes surreptitious, in smoking, were ascribed by the sufferer to almost any other possible cause, and much of the evil wrought by this agent was also ascribable in part to other associated indulgences, such as over-feeding, suppers, and drink.

The extent of these minor disorders may be demonstrated by the fact that in 1879 there were 215 admissions to the sick list of this sort of disease, during the nine months of life at the Academy, and 184 during the same period of 1880.

It may be said, in passing, that during the present quarter, since the beginning of which tobacco has been interdicted, but one half as many of this class of diseases have been admitted to the sick list, as during the corresponding quarter of last year when its use was unrestricted.

No one pretends to doubt that the excessive use of tobacco is attended with serious damage to health, and often with danger to life.

In regard to its moderate use by adults, while the weight of recorded medical testimony is against it, the opinion is not unanimous, and the evidence of its injurious effects is by no means conclusive. Its effects upon growing youths will be considered further on.

The active principle of tobacco is an alkaloid called nicotine. It is a pale amber-colored or colorless liquid, volatile, its vapor having the odor of tobacco. It is very virulent, and poisonous to man in minute quantities and with great rapidity.

A suicide died in from three to five minutes after swallowing an unknown quantity; and a man<sup>1</sup> was poisoned with it, dying in five minutes. Experiments upon the lower animals have shown that it is a rapid poison in very small doses.

It is doubtful to what extent nicotine is concerned in producing the sickness, vertigo, prostration, etc., consequent upon the first indulgence in smoking or chewing tobacco, or the solace and comfort after these first effects have been overcome by perseverance.

Vohl and Eulenberg, in their experiments, were unable to detect the presence of nicotine in tobacco smoke, and they assert that the action of the latter is due to pyridine, picoline, collidine, and other bases of a homologous series, formed by the combustion of tobacco together with hydrocyanic acid, sulphureted hydrogen, and various acids.

Chemically pyridine is  $C_5H_5N$ ; picoline  $C_6H_7N$ ; collidine  $C_8H_{11}N$ ; and nicotine  $C_{10}H_{14}N_2$ .

Pyridine and picoline have similar physiological effects to nicotine, and resemble the latter in smell. The action of these bases is less rapid than that of nicotine, and of the series, pyridine is the most volatile and stupefying. Tobacco itself applied to wounds, open sores, eruptions of the skin, or abraded surfaces, or taken internally, acts as a poison.

In the form of enema it has proved fatal. A case reported in the "Edinburgh Medical Journal" and cited in "Taylor on Poisons," that of a girl aged eighteen, who received a clyster of a decoction of three drachms of common shag tobacco in a pint of water, died in an hour and a half.

On inspection in this case, the heart was found very flaccid; there were three drachms of black fluid blood in the ventricles. The intestines presented no trace of inflammation or redness in any part, and there was no smell of tobacco (thirty-six hours after death) either in the intestines or in any part of the body. The head was not examined.

In former times, when enemata of tobacco were used to favor the attempts at reduction of strangulated hernia, serious and fatal consequences sometimes followed. Dr. McGregor<sup>2</sup> has seen severe symptoms follow the administration of an enema containing but half a drachm in decoction.

By the mouth, death has been caused by an infusion of thirty grains — and, like nicotine, its fatal effects were very rapid.

A dislodged plug of inspissated tobacco juice from a pipe, accidentally swallowed, caused headache, giddiness, dryness of fauces, and insensibility, followed by copious and repeated vomiting, with return of consciousness and recovery after passing through a restless somnolent state, with malaise and faintness the next day.<sup>3</sup>

<sup>1</sup> M. Fougner, see *Taylor on Poisons*.

<sup>2</sup> *Taylor on Poisons*.

<sup>3</sup> M. A. Marchant, *Journal de Bruxelles. American Journal Medical Sciences*, October, 1866.



A smuggler covered his naked body with tobacco leaves with a view to defrauding the revenue of the amount of the duty. The tobacco, moistened by the perspiration, produced poisoning through the skin.

The extreme feebleness of the pulse, its smallness, the cold sweat, the fainting, presented analogies with the condition called by Decaisne, narcotism of the heart, and which he noticed to disappear or diminish when the use of tobacco was suspended or diminished.<sup>1</sup>

Tobacco is rarely used internally as a medicine. It is recommended in tetanus, in which its relaxing power over the muscles might reasonably be supposed to act against the spasm. In the tobacco factories of France it is supposed to be prophylactic and curative to several diseases, especially phthisis.

It seems to be prophylactic against intermittent fevers and itch. Dr. S. P. Crawford, of Nashville, regards it as an antidote to malaria.<sup>2</sup>

M. Melier could not discover that it was preventive or curative in phthisis.

He regarded the effects of tobacco upon workmen in the tobacco factories as injurious to health. Its primary effects, lasting from eight to fifteen days, were, headache, nausea, loss of appetite and sleep, and diarrhœa.

The consecutive effects were manifested by a peculiar grayish tinge of the complexion.

This was, however, uncommon, and observed in certain factories only. From an analysis of the urine by M. Felix Boudet, there was reason to suppose that it contained nicotine.<sup>3</sup>

Many incidents of accidental death are recorded when it has been taken as medicine, or for malingering purposes.

That this substance, to acquire the toleration of which, to say nothing of enjoyment, costs so much in suffering — nausea, vertigo sickness the most profound, cold sweat, palpitation, tremor, and prostration, should be of such extended use, and be so dearly prized as a luxury by every race within whose reach it has come, is a proof that it satisfies some great craving, or supplies some need in our economy.

In its effects upon the system it may be classed with tea, coffee, maté, the betel nut, coca, and alcohol.

In common with some of these, it enables its consumer, in some degree, to resist the pangs of hunger and to endure fatigue and privation.

It is calmative and restorative, within certain limits, and soothing and comforting to mental strain, and to anxiety and distress.

It is anodyne, hypnotic, a companion in solitude, and when smoked, it is eminently a sociable and convivial enjoyment. Within the limits of moderation the evidence of its injurious effects upon adults is not conclusive, although it seems probable, as has been claimed, that prolonged addiction to its use, even within the most moderate limits, is often attended with chronic cumulative poisoning.

<sup>1</sup> Dr. Namias, *American Journal Medical Sciences*, October, 1864, from *Gazette des Hôpitaux*.

<sup>2</sup> *New York Medical Record*, March 15, 1871.

<sup>3</sup> M. Melier. "Health of Workmen in Tobacco Factories." *Gazette Médicale de Paris*. *American Journal Medical Sciences*, July, 1845.

"In small doses," M. Gustave Lebon says, "that tobacco smoke instantaneously excites cerebral activity, and the intellectual forces, and facilitates digestion. In excessive and frequently repeated doses it produces difficulty of digestion, benumbed intelligence, and clouded memory." I dare say most smokers will more readily recognize the stimulation than the depression thus described.

Indeed, while such symptoms as disordered digestion and associated headache, or dryness of the tongue and fauces, may be put down as the ordinary consequences of unusual indulgence, the benumbed intelligence and clouded memory can only be supposed to follow extreme and prolonged abuse.

In military and naval life tobacco comes in with much of the effect attributed to coca and maté, in times of privation, and in the storm of wind and battle.

Cold, wet, hunger, fatigue, night watches, and long marches seem to be admirable antagonizers of its evil consequences.

The London "*Lancet*" of November, 1870, in speaking of the Franco-German war, says: "If there be one fact that has been more frequently stated than another, it is, that the soldiers engaged in this war — well or wounded — seek the solace of tobacco. The inhabitants of every nation manifest similar instincts, and one of the strongest, is this desire to seek out some substance, the use of which may soothe or stimulate the nervous system.

"The soldier, wearied with long marches and uncertain rest, obtaining his food how and when he can, with his nervous system always in a state of tension from the dangers and excitement he encounters, finds that his cigars or pipe enable him to sustain hunger or fatigue with comparative equanimity. Explain it as we may, this is physiologically true; and medical officers who would not be sorry to see the issue of a 'spirit ration' discontinued, are compelled to allow that the moderate use of tobacco by soldiers in the field has several advantages."

But whatever may be the effects of moderate smoking, — and the term is of course a relative one, depending upon constitution, temperament, occupation, and surrounding circumstances, — the abuse of tobacco is soon followed by symptoms of poisoning, acute or chronic. In regard to the influence of surroundings the writer of this has observed that officers often smoke much more at sea than when ashore or at home, and that in his own case tobacco at sea, or at least on board ship, has infinitely more attraction, and is far better borne than when living at home, where, indeed, it almost ceases to be a habit. In two visits to the seaside in successive summers, and in traveling by rail, the change in mode of living seemed to operate in creating a desire for tobacco and securing tolerance of a large consumption of it, similar to the experience of sea life.

In considering the use of tobacco in excess, besides the chronic and local affections induced, we find very much the same effects as when taken in poisonous doses by accident. Among the former is an inflammatory condition of the mucous membrane of the lip and tongue, congestion and dryness of the mucous covering of the tonsils and larynx.

The inflammatory action also extends to the posterior and sometimes even to the anterior nares, and passes to the conjunctiva, with resulting headache, redness, and lachrymation; and a peculiar spasmodic action of the orbicularis muscle of the eyelid is experienced, together with intolerance of light on awaking from sleep.<sup>1</sup>

Dr. Laycock thinks the dull, heavy headache, so well known to smokers who have exceeded their allowance over night, to be due to the extension of this irritation to the frontal sinuses.

In extreme cases, he says, there is gastritis. The action of the heart and lungs is impaired by the influence of the narcotic on the nervous system, but a morbid state of the larynx, trachea, and lungs results from the direct action of the smoke. The same observer compares the action of tobacco to that of green tea, exciting to watchfulness, or to dreams which leave no impression on the memory: the passing off of which leaves a greater susceptibility in the nervous centres to impressions, as indicated by trembling of the hands and irritability of temper.

Dr. Wright, of Birmingham, believes it to be a great antagonist of the functions of the nervous system, especially in its relations to the organs of sense, of reproduction, and of digestion.<sup>2</sup>

M. Sichel, in speaking of tobacco amaurosis, says that in his opinion "there are few persons who have smoked during a long period more than five drachms of tobacco per diem, without having their vision, and frequently their memory, enfeebled."<sup>3</sup>

A case of poisoning, with sudden death, is reported by L. L. Dow, occurring in a cigar-maker, forty-nine years of age, and apparently due to excessive smoking and prolonged presence in a room filled with tobacco smoke.

At the autopsy the description agreed with Von Boeck's description of the morbid state,<sup>4</sup> viz.: "Vascular engorgement of the brain and its membranes, serous fluid in the ventricles of the brain, are mentioned in all published reports. The heart is generally empty, and the blood found in the vessels is of a dark red color. The liver, spleen, and kidneys are generally hyperæmic."<sup>5</sup>

As most of the evils wrought by the abuse of tobacco seem to be through its influence upon the nervous system, it is not surprising that mental alienation has been ascribed to it. And a progressive increase of insanity in France has been shown to accompany the increase in the consumption of tobacco.<sup>6</sup>

In a paper by M. Decroix, published in the "*Bulletin de l'Association Française contre l'abus du Tabac et des boissons Alcooliques*," he enumerates no less than sixteen diseases, the list beginning with cancer of the tongue, and ending with idiocy and premature old age, as resulting from the use of tobacco.

<sup>1</sup> Dr. Laycock.

<sup>2</sup> *London Medical Gazette*, October, 1846.

<sup>3</sup> *L'Union Médicale*, No. 54. *American Journal Medical Sciences*, October, 1863.

<sup>4</sup> Vide Ziemssen's *Cyclopædia*.

<sup>5</sup> *New Remedies*, March, 1881. *Medical News and Abstract*, November, 1881.

<sup>6</sup> *Blatin sur la Nicotine et le Tabac*.



Becquerel<sup>1</sup> says: "Quant aux effets généraux sur les facultés intellectuelles, nous signalerons la remarque faite par M. Danet, et vérifiée par Bertillon, qu'à l'école Polytechnique *les fruits secs* sont de grands fumeurs."

I have seen a case in which symptoms of angina pectoris of a very alarming character, with enormously profuse sweating, and great slowness of the pulse, were probably due to excessive smoking of very strong tobacco.

All writers upon the subject agree that the effects of tobacco upon the young are bad. The mode in which tobacco was used by the cadets at the Naval Academy was perhaps as bad as could have been devised. The cadets were allowed to smoke in their bed-rooms only. The condition of the atmosphere in these apartments, about nine o'clock each evening, was indescribably foul and close.

That persons could get accustomed to it, argues strongly in favor of the tolerance speedily acquired by tobacco consumers. The heaviest smokers among the officers would occasionally find apartments, in their visits of evening inspection, the odor of which would cause a qualm. This condition was peculiarly hard upon non-smokers, room-mates of others addicted to the practice.

These seldom complained; a point of honor kept their mouths closed, but admissions of their sufferings would sometimes be confided to medical officers on occasions of sickness. In cold winter weather, when doors and windows are kept closed, even when the occupants of these rooms had gone to bed, the air breathed by the sleepers must have been a concentration of foulness and poison.

Dr. Charles R. Drysdale, in the "Medical Press and Circular," of February 12, 1873, says: "If the smoking takes place in closed rooms, then not only are the nicotine and other parts of the tobacco taken up in the mouth, but also with each breath a portion of the tobacco smoke contained in the air of the room. The quantity of injurious substance of course becomes the greater just in proportion as the room is smaller and there are more smokers.

"A railway smoking carriage is of course the *ne plus ultra* of unwholesomeness in this respect. With regard to persons who, themselves not smoking, remain in chambers where smoking takes place, they cannot in any way escape the injurious effects of tobacco smoke. If they do not inhale so much injurious matter as the smoker himself, still they take in on each breath a quantity of the constituents of tobacco smoke mingled with air; and to such a degree that he or she who lives in such a room takes in more nicotine than a smoker does who smokes only in the open air. Hence it appears that women who serve in public-houses and cigar divans, are materially injured by a vice which their own sex is innocent of; and this fact may, perhaps, restrain some good-hearted male, who is quixotic enough not to care sufficiently for his own health.

"It is now well known, by the observations of Dr. Kostrál, in the Austrian state tobacco manufactory, that persons employed in tobacco man-

<sup>1</sup> *Traité d'Hygiène.*

ufacture are subjected to many diseases, especially in the case of young women and boys."

It was this mode of smoking which, even if the exact amount of smoking had been equal in the two conditions, made the permitted practice so much worse than the surreptitious. For when smoking was indulged in, in spite of interdicting regulations, the culprit took good care to conceal the evidence of his transgressions by getting rid in some way of the tell-tale smoke and smell. In that case he did not poison his room-mate, and he did not breathe and rebreathe the nicotine and pyridine and ammonia and what-not other products of his pipe, during his hours of sleep.

Of the effects of tobacco upon sexual development there has been little but the most inferential evidence at this school, but almost all writers testify to the direct and indirect perversion of the generative function in those addicted to its use, or exposed to its influence by occupation. Dr. D. F. Lincoln says: "With regard to workers in tobacco, it is said by Tracy, of New York, that they have very small families, quite the reverse of what is the case usually with working people. He found only four hundred and sixty-five children in three hundred and twenty-five families. It is not certain what the cause of this peculiar condition may be, but it is quite probably due in large measure to the premature commencement of work, and to the influence which tobacco has in *checking the sexual development* in young girls.<sup>1</sup> It is certainly desirable to keep young persons under sixteen from its use."

"Tobacco ought to be interdicted to women and young persons whose natural nervous susceptibility is easily excited (*exaspérée*) by its influence."<sup>2</sup>

M. Caron suggests that the greater relative frequency of typhoid fever in males may depend upon the almost universal habit of smoking among men, especially as the habit is so often begun at a very early age, before the subject has attained the full powers of adult life.

This habit perverts the functions of the salivary glands and other organs, and the economy is injured by the absorption of poisoned secretions.<sup>3</sup>

Many fatal cases of children and youths from smoking and chewing have been recorded.

A case of death is reported in the "New York Medical Record" of October 6, 1877 — that of a boy who was admitted into the Melbourne Hospital suffering from the effects of chewing, complaining of headache and dysentery. He became gradually unconscious and paralyzed, and died on the following day.

The following case is one described by Passed Assistant Surgeon M. H. Simons, United States Navy, in a letter to Medical Director Gihon, who has kindly sent it to me. The case is not given in full, and the details of treatment are omitted. The medical attendants considered it one of tobacco poisoning, but had some doubts.

The patient had never lived south of Boston, says Dr. Simons, intending to intimate, I suppose, that malaria was an improbable factor in his case.

<sup>1</sup> *School and Industrial Hygiene*, 1880.

<sup>2</sup> Arnould, *Nouveaux Éléments d'Hygiène*, 1881.

<sup>3</sup> *La France Médicale*, 1877, No. 87. *Philadelphia Medical Times*, January 19, 1878.

H. C., aged sixteen years; born at Portsmouth, New Hampshire; phlegmatic temperament; large for his age; height five feet eleven inches; weight two hundred pounds. Has been addicted to smoking tobacco for more than a year.

On Thursday he smoked more than usual, a pipe, followed by two or three packages of cigarettes, "as fast as he could."

This was followed by nausea, and for two days he suffered with anorexia and constipation. On the Saturday, about two o'clock A. M., he was seized with severe occipital and cervical pain, and vomiting, and colicky pains in epigastrium. Dr. S. saw him at ten P. M., and found him complaining of pain in the head, neck, and abdomen; face flushed, right tonsil swollen and inflamed, photophobia, pulse 102 and full, tongue red, skin dry and hot, occasional vomiting of greenish fluid, and very restless.

The next day, Sunday, May 8th, had slight fever, swelling of tonsil abated, great restlessness, severe pain in back of head and neck.

*Monday.* — Face pale, excepting a narrow streak of red extending from chin over both cheeks, pulse 100, tongue furred and swollen, tonsil slightly swollen and ulcerated, fever slight, skin moist, photophobia, speech incoherent, bowels constipated, constant rubbing of his head, rolling from side to side and kicking, pupils slightly contracted.

*Tuesday.* — Pulse 62, full and firm, pin-head pupils, tongue coated, dark in centre, edges red and much swollen. Articulation very difficult, skin cool and moist, bowels constipated, restless.

In afternoon had a large and very foul operation of the bowels after a dose of Sal Rochelle, and passed a great quantity of dark colored urine.

Tongue greatly swollen, articulation impossible. He obeyed orders sharply given, otherwise noticed nothing. No sleep since noon of Monday. Tips of fingers and feet cold and blue at two P. M. until nine P. M., when he became feverish and more restless.

*Wednesday.* — Pulse 70, skin moist, temperature 101°; tongue swollen and covered with sordes, constipation, abdomen tympanitic, can swallow but cannot articulate, very restless; slept two hours in the afternoon; coldness of extremities came on at three P. M., not followed by fever. Slept a little during the night. At nine P. M. talked incoherently, but could not articulate plainly.

*Thursday, May 12.* — Restless and delirious in the early morning, but rousable; pulse 78, full and firm, skin moist, tongue less coated and less swollen, articulation plain, said there was no pain in occipital and cervical regions.

From this time the patient improved and was about again in ten days.

The treatment was by cathartics, stimulants, ergot, and quinine.

There seems to have been paralysis of vaso-motor nerves of tongue, base of brain, and medulla, and consequent congestion. The gustatory nerve was apparently all right, for he made wry faces and objected to the quinine and first doses of ergot.

This case, although somewhat obscure, is a very interesting one, and in the sequence of symptoms corresponds with the result of the observations of several writers.



The use of tobacco by youths can never be regarded as moderate. It is generally excessive in the literal sense of the term, but its effects, even when but little indulged in, are those which characterize excess in adults. The depressing effect of tobacco upon growth by diminishing the forces concerned in tissue change, its effect upon the heart and pulsation, the disturbance of muscular coördinative power, of ability to concentrate the mind upon study, the dyspeptic troubles, impairment of vision, headaches, and the retardation of sexual development and disturbance of that function, are conceded by most observers, and clearly demonstrated by many, as has been already shown.

Dr. Richardson says: "As the human body is maintained alive and in full vigor by its capacity within certain well defined limits to absorb and apply oxygen; as the process of oxidation is most active and most required in those periods of life when the structures of the body are attaining their full development; and as tobacco smoke possesses the power of arresting such oxidation, the habit of smoking is most deleterious to the young, causing in them impairment of growth, premature manhood, and physical degradation." Dr. Gihon, in his report on this subject,<sup>1</sup> says: "That so many adults use tobacco with apparent impunity, or even admitted benefit, is no argument in favor of its use by growing lads, for while tobacco, by arresting molecular waste of tissue in the mature man, may help to maintain the integrity of the organism, in the adolescent this very effect is detrimental, since it retards that progressive cell-change upon which the advanced development of the body depends."

At this Academy instances of almost all the evil effects of tobacco have been brought to the notice of the medical officers. Many of the cases of "irritable heart," supposed to be induced by gymnastic exercises, I believe to be caused by tobacco.

A cadet, aged twenty, was ill in the sick quarters with tonsillitis, accompanied with moderate fever. I noticed great irregularity of the pulse, together with frequency, 106 to 112, not to be accounted for by other symptoms. Upon his recovery from the tonsillitis I found the intermittence of the pulse continued, although less marked, and the beat still over 100, and excited to 120 or more upon slight exertion. No evidence of organic cardiac disease. He was of a very pale complexion, although of large frame and fine muscular development. I interdicted active exercise, drills, and the gymnasium, and enjoined rest and the avoidance of violent exertion. But no improvement was perceived after a fortnight's rest. Careful questioning elicited the fact that he was an inveterate smoker. He smoked all the time he was in his quarters, when not "turned in," pipes, cigars, cigarettes.

I urged upon him the importance of trying the effects of discontinuing this habit, and he promised me to do so. At the end of a week I found his pulse 76 and perfectly regular. I had concluded too rapidly that his disorder was due to over-exertion in the gymnasium, but this was no doubt a "tobacco heart." He resumed his athletics, trained for the tournament, in

<sup>1</sup> *Sanitary Report of United States Naval Academy, 1879.*

which he took a distinguished part, and had no further trouble. I have seen several other cases of cardiac disturbance among the gymnasts, in which recovery has followed abstinence from tobacco without discontinuance of exercise.

A case of gastric disturbance, traced to immoderate smoking, was characterized by obstinate vomiting which lasted just one week. In this case the pulse was normal, there was no fever, and the temperature was lowered to 97° F.

The derangement of muscular coördinative power is one of the most striking of the ill effects of the tobacco habit observed at this Academy.

Professor Oliver, head of the Department of Drawing, has noticed this effect for many years. In these cases there is not only tremor and inability to perfectly control muscular effort, but there seems also to be some other defect, mental or visual, by which the direction of lines is not properly understood or perceived.

A most remarkable example of this I append to this paper, in the form of a tracing<sup>1</sup> of a drawing made by one of the cadets, partly when in his normal condition, and partly when under the influence of tobacco smoking. It has been kindly given me by Professor Oliver, with the following letter:—

*“Dear Sir, — I wish to call your attention to the accompanying drawing, or tracing of a drawing, made by a fourth class cadet at this Academy. The drawing shows in parts the effect of the use of tobacco by the cadet within some four hours of the period during which he received instruction.*

*“The parts in red are those executed on the day in question, and under the effects of recent smoking. You will observe a certain tremulousness and uncertainty of line (and this in my experience is one of the most important points), and a very unfinished appearance of the parts in red, as though the cadet had begun to make an effort and had then suddenly lapsed into carelessness and indifference. The effects of smoking on muscular action have come under my observation frequently during a service of fourteen years in the Department of Drawing.*

*“The effect of smoking on cadets learning to draw is as unmistakable as it is held to be by trainers on men training for a boat race.*

*“As regards drawing, tobacco has a specific effect on the coördinating faculty, which is used in the act of drawing in a very delicate and complicated manner. In an experience of fourteen years, many thousands of drawings having passed through my hands, I have had occasion to challenge cadets on their use of tobacco in smoking, as evidenced by their work, and I have in no instance made a mistake.*

*“I should say here that the tracing is not so minutely accurate as it ought to be, and does not show so plainly as it ought the peculiarities of line that smoking is apt to produce, but it serves to illustrate.*

*“Very sincerely yours,*

*MARSHAL OLIVER.”*

<sup>1</sup> This tracing has unfortunately been mislaid since this paper was received. — EDITOR.

Dr. B. Joy Jeffries says that tobacco will cause color-blindness.

I first joined the Annapolis station in 1873, when I took charge of the Naval Hospital near the town, and was then for the first time, although indirectly, connected with the Naval Academy.

At that time the two upper classes were allowed to smoke. Of course every man upon entering the second class became a smoker by right of seniority and in virtue of promotion. There was a smoking room for the cadets, where the leisure hour was spent, which would have been better employed in the play-ground.

The objectionable features of this room became so prominent that long before the order prohibiting smoking was issued it was closed.

In December, 1875, a board of medical officers was convoked by Rear-Admiral C. R. P. Rodgers, Superintendent of the Academy, to report upon the subject of the effects of tobacco upon the cadets. This board, consisting of Medical Inspectors Gihon and Gorgas and Surgeon Bright, strongly recommended the prohibition of its use in the Academy. Accordingly, Admiral Rodgers issued an order forbidding the use of tobacco in any form by the cadets.

In 1879, however, this order was rescinded, and the use of tobacco was permitted to all the cadets in the Academy. I have already described the condition of their sleeping apartments under this state of things.

It was a common remark last spring, that the cadets looked pale, and this was very striking when they were drawn up in line at "formations." And indeed they might well be expected to be pale, for very few of them slept in any other than a poisoned atmosphere.

At the beginning of the present academic year, upon the return of Rear-Admiral Rodgers, to the superintendency, the interdiction was renewed, to the satisfaction of everybody connected with the management of the Academy, and to the great joy of many of the cadets. Of all the officers here who, in 1879, had favored the plan of unrestricted permission to smoke, none failed to confess that the experiment had been a failure.

There has been but little trouble in enforcing this regulation, and I believe that the violations of the order are not numerous.

The Board of Visitors of the United States Military Academy at West Point, for the year 1880, expressed "surprise and regret" that the use of tobacco was permitted there, and recommended its prohibition.

An order forbidding "the use of tobacco in any form by the cadets" was issued in June, 1881.

The two great national Academies have thus taken a step forward in a matter of great hygienic importance, and have set a good example to the educational establishments throughout the country. I trust that in the future neither Academy will furnish any statistics of the evil effects of the tobacco habit.



## XXIV.

### SCHOOL HYGIENE.

By H. ISAAC JONES, M. D.,

*Scranton, Pa.*

It is said, with every increase in the world's stock of gold, that the metal loses some of its value, while every addition to the world's store of scientific truth, adds to the value of that it already has, and is a step to the acquisition of more ; and if this be true of science generally, it is true in the highest and broadest sense of the word, of the science of hygiene and sanitation. There has long been a growing sense of the need, which undoubtedly exists, for an ample and practical recognition of the interest and principle of school hygiene as an integral part of state policy ; they demand broader and clearer views from the government.

It must become the duty of this Association to institute inquiry concerning the hygienic condition of school life, and the physical and mental training of the young in schools, whether public or private, which may prove of value to the parents and school authorities : to the former, by supplying them with data as to the points a good school should offer in the way of several sanitary and hygiene management ; to the latter, by providing them with a series of rules, by the exercise of which they can maintain strict sanitary supervision over the school and inmates, with definite instruction how to proceed in case of epidemic breaking out in the neighborhood. To arrive at true knowledge of the condition of schools in this country, would be to seek the cordial help of those who are engaged in the care and culture of the young, counting with confidence on the fact that a spirit of earnestness pervades the ranks of those so engaged. The days of Dotheboys Hall of Dickens, are past ; the faults of to-day are errors of judgment, or defects arising out of, if not due to circumstances.

The part played by schools in the dissemination of infection, is only now beginning to be apprehended. The assembling together of children in schools, during an epidemic, constitutes one of the most formidable sources of those local outbreaks of the infectious diseases of children, and particularly of scarlet fever and diphtheria.

Children crowded and sitting close together on benches, perhaps, in ill-ventilated school-rooms. It can be readily understood how the conditions of school life are peculiarly favorable to the transmission of infectious diseases, whether the infection be conveyed from an individual, in the early stage of a spreading disease, or from the infected clothing of children coming from a house where infection exists. There can be no wish, even on the part of

the most enthusiastic supporter of education, that our schools, while serving their primary object, should serve also as a breeding ground for infectious diseases. When the Board of Health and school directors work cordially together, no difficulty has been experienced in closing, or otherwise regulating the management of schools, so as to exercise the most important influence in limiting the spread of infectious disease among the young. On the other hand, when cordial relations have not existed between these two bodies, the school has remained a hot-bed of contagion. I must state here, that the best of relations exist between our school directors and Board of Health. It will be a happy moment for the health's interest of humanity, when the process of education is made to include training, with a view to eradication of inherited disease, the repression of morbid idiosyncrasies, and the scientific—that is, physiological, and psychological—culture of such faculties and attributes of the mental and bodily organism as shall conduce to perfect health. Meanwhile, it is perhaps in respect to the ventilation of school-rooms, the length of time spent in study, the method of studying, the posture of the body, long maintained, and the management of light, with the consequent strain on the eye-sight of children and of growing youth of both sexes, that most can be done.

Sanitary arrangements of schools, as regards drainage, etc., there is much to be said on these topics. I venture some practical remarks on the subject.

In this paper I shall borrow figures on “cubic space” from the statement of the late Prof. E. A. Parkes, under whom I studied “Military Hygiene,” prior to entering the English army. It is impossible to expect that the air of an inhabited room shall be absolutely as pure as the outside air, for nothing short of breathing in the open air can insure perfect purity at every respiration. In every inhabited room there will be some impurity of air; the practical limit of purity will depend on the cost which men are willing to pay for it. If cost is disregarded, an immense volume of air can be supplied by mechanical contrivances.

The question therefore arises, What is the standard of practicable purity of the air we should endeavor to obtain for our school rooms? From calculations made by Professor Parkes and Dr. de Chaumont, the amount of air required for each adult per hour, in order to maintain a certain degree of purity in the atmosphere, is 3,000 cubic feet. The respiratory impurity added to the air will, of course, be less with children than with adults, and consequently the amount of air required to maintain the standard of purity will be less, though children evolve absolutely less  $\text{CO}_2$  in a given time than adults; yet relatively, for their body-weight, they expire more.

In fixing standard for school, the age, too, of children, ought to be considered: they require 2,000 cubic feet.

In public school-rooms, where the boys are not confined more than two hours at a time, the room can be purified by opening the doors and windows when they are out; also where an efficient system of ventilation was adopted, 450 cubic feet would probably be sufficient, and the air of the room not be detrimental to health. We all know that our public schools do not have more than 100 cubic feet, if they have this much, for each child; we

must therefore consider the means by which foul air may be removed and fresh air introduced, so that the standard of purity can be maintained without making use of rooms of inconvenient size. This is afforded by ventilation, which may be natural or artificial. How often is the air to be changed in a given time? According to Professor Parkes, if the space to be ventilated be equal to 100 cubic feet for each person, the air must be changed twenty or twenty-five times in an hour, in order to supply 2,000 cubic feet, considered necessary for children. If the air has to be changed frequently within a given time, draught is occasioned. London (England) school-board gives 130 cubic feet for each child.

According to the London "*Lancet*," as a rule, 450 cubic feet seems to be the average of what is given in the best schools. This is far too little; and when we reflect how important pure fresh air is for young persons, in order to effect properly the tissue changes which are most active at this age, and how very susceptible they are to the influence of animal poison, the necessity of providing them with ample breathing space becomes apparent.

Although the expense of construction of rooms sufficiently large to provide the full allowance that has been considered necessary (650 cubic feet for children under twelve years of age, and 830 cubic feet over that age), is an important consideration; still an approach to the standard ought to be aimed at, either by reducing the number of scholars, or providing additional building.

Fortunately the ventilation of our schools is carried on by the chinks of the doors and window-sills.

Temperature of school-rooms should not be allowed to fall below 55°, or rise above 60° F.

There are several ways of artificial ventilation devised by sanitary engineers: "Method of extraction or propulsion where the former is employed, fresh air, previously warmed, can be introduced from the upper part of the room, and the foul air drawn off from the level of the floor. In deciding on the adoption of artificial or natural ventilation, many circumstances have to be considered. Artificial ventilation is best adapted for large buildings, in which a series of large class-rooms on the same floor are built, have to be warmed. The best method is by extraction." A system of propulsion is more suitable for our large school-rooms.

#### TIME AND METHOD OF STUDYING.

School life is essentially an unnatural one; school training is necessarily an artificial process, and unless it is conducted under rational and favorable conditions, universal education can never be a universal blessing.

There is little doubt that the mental pressure, which is now so common in schools, causes an excessive waste of nerve force for mental work, which should be subservient to bodily growth and development; and it is important that parents should be aware of the possibility of sacrificing physical to mental development. The reverse may certainly occur, the result being a fine but not very intellectual animal, and therefore in this, as in many things, it is "the happy medium" that is the best and safest. Mental overstrain in



poorly fed children, and bad hygienic surroundings, produces a vast amount of diseases. The system of "cramming for exhibitions," and what Professor Huxley calls the "abomination of desolation," of competitive examination, prizes, etc., that goad on children of different strength and capacity to tasks that the brightest and strongest are hardly equal to, is responsible for much injury of mind and body; and the higher education, now so earnestly demanded for the gentler sex, is too often bought at the expense of shattered constitution and unstrung nerves. But if these things must be, in the name of all things and justice, let them be surrounded by all the checks that can lessen their power for evil.

#### POSITION LONG MAINTAINED.

As the muscles of the back become fatigued by sitting long in a constrained position, the tendency is to bend over more and more; and this faulty position, at first assumed for temporary relief, becomes, by frequent repetition, a confirmed habit, and may end in a permanent deformity. A distinguished "orthopedic surgeon" has stated that ninety per cent. of curvature of the spine, not induced by local disease, is developed during school life; and we are aware that stooping and crooked positions at school have a sad effect upon the heart and lungs and abdominal organs as well as on the spine and sight. The most common and important defects in school furniture are the benches with unsuitable backs, too great a distance between the seat and the desk, too great a distance between the height of the seat and the desk; the size and form of the desk and its relation to the seat are not without their effect upon the welfare of the eyes.

To use desks and seats of the same pattern and size for a large number of children of all ages, as in our public schools, is not more rational than the system of distribution of army clothing, by which, as Dickens complains, all the "tall soldiers" got the short pantaloons, and the "short soldiers" got the long ones. If a child is uncomfortably seated he is pretty sure to lean forward to the desk, thus bringing his eyes too close to their work, and at the same time overfilling their blood-vessels by gravitation. The backs of the seats ought to be straight, and consist of a piece of wood four inches broad. If this is adjustable it would suit any child. The proper height of this back ought to be close above the hips, to support the loins sufficiently to make it easy and comfortable for the most delicate children to sit perfectly straight. They ought to be broad enough to support almost the whole length of the thigh, the height of the seat enough to allow the sole of the foot to rest in its natural position, and the desk high and close enough to allow the elbow to rest upon it without displacing the shoulders. A flat desk promotes stooping position, with its attendant evils of close sight and gravitation of blood to the eyes, and besides, does not permit the direction of vision most favorable to the natural and easy movements of the eye-balls.

An inclination of  $40^{\circ}$  to  $45^{\circ}$  is considered the best for reading, as when the body is erect and the eyes are directed downwards and forwards this brings the page at about the right angle with the line of vision. This

would be too steep for writing, but by a simple mechanism the desk and seat can be made adjustable to any child.

MANAGEMENT OF LIGHT, WITH THE CONSEQUENT STRAIN UPON THE EYE-SIGHT.

As the sense of sight is the chief medium of education, it is hardly possible to over-estimate the importance and necessity for carefully observing the management of light in school-rooms. It has been positively established, by careful and extensive statistics, that short sight is most frequently, if not almost exclusively, developed during school life. This is due partly to the fact that the eye, during this period of its growth, is more liable to change in form, and partly to the fact that children have a much stronger power of accommodation than adults, and therefore hold objects much closer to the eyes. The book or paper should never be closer to the eye than ten inches. If there is short sight enough to prevent the letters from being distinct at this distance, it is better to wear proper glasses in studying.

As a vast amount of reading is done by artificial light, and by imperfect eyes, the print should be large and clear enough to be seen with ease, and pale ink should not be used in writing.

In erecting public schools it involves but little extra expense to provide windows of sufficient size. Architectural beauty ought to be a secondary consideration, where such grave practical interests are involved. "The real beauty of a building consists, above all things, in the perfect adaptation of a building to its use."

In some of the Swiss schools the plan has been adopted of fixing shades at the bottom of the windows, so that they may be unrolled upwards instead of downwards. By this arrangement, when light is excessive it can be modified by excluding the portion that is less useful and agreeable, and admitting only that which comes from above. Light striking below the top of the desk can reach it only by reflection, and is uncertain and confusing from the shadow thrown upon the book or paper, by the shoulders, head, or hand. Dr. Cohen maintains that a school-room cannot have too much light, and recommends the very large proportion of a square foot of window glass for every square foot of floor, and that less than about half this proportion should never in any case be allowed. The arrangement that Mr. Leibrieck advocates is to have the class-rooms of an oblong shape, the windows being in one of the long sides, and the tables arranged parallel to the short walls, so that the light falls from the left side. The desk of the master ought to be placed near the short wall, towards which the scholars look, the great object being to prevent the shadows from the boy's hands or person falling on the paper or book. There are some schools so badly constructed, as regards their windows, that twilight commences in them quite early in winter afternoons, even when it does not exist all day. When the light is always defective, the reading, writing, and drawing should not be pursued for more than one hour without interruption. With artificial light the lamp should be placed in such position that the least possible shadow is not

thrown upon the scholar's book or paper, and means ought to be taken to carry off the products of combustion.

#### ASTIGMATISM.

No doubt you all know what this is. Children in school affected with this disease often appear stupid or inattentive, they do not recognize a word quickly, it seems to come to them afterwards. The cause of this is that the perpendicular and horizontal lines of the letters have a different focus, and a mental effort is required to combine them. When the sensitiveness of the retina becomes exhausted from fatigue or other cause, the impression of a larger image is required, and the book is held closer to the eyes. When teachers see anything that is not all right with children's eyesight they should cause them to lay their books aside. Therefore, the direction of the light in schools should be carefully studied. Children with "myopia," "long sight," or "astigmatism," often struggle on for years under painful disadvantages, until they finally break down and an oculist is consulted; and of course they need glasses, and are old enough to wear them if they are old enough to study. They may not be becoming, but neither are headaches, blood-shot eyes, wrinkled brows, half-closed lids, or squints, any or all of which may be the only alternative, so far as personal appearance is concerned, to say nothing of the importance of continuing their education with comfort and safety.



## XXV.

### SUICIDES IN NEW YORK CITY,

*During the Eleven Years ending December 31, 1880, showing the Sex, Age, Color, Nativity, Means used for Self-destruction, and the Season of the Year when committed, together with a Comparison of the Deaths by Suicide in Two Hundred and Forty-seven American and Foreign Cities in the year 1880, obtained from Official Sources, and the Proportion of Suicides to the Population of New York City from the year 1804 to 1880, inclusive.*

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ALTHOUGH the word suicide is defined as "the act of taking one's life committed by a person of years of discretion and of sound mind," and although it is asserted that in a legal sense "the taking of one's life as the result of an insane delusion or impulse is not suicide," it may be necessary to explain to those who view the accompanying tables, that this interpretation is not strictly adhered to in them, and that the tables of suicide include all deaths of persons who have taken their own lives, unless such deaths were clearly proven to be accidental. This, I think, is the popular understanding of the word suicide, although it may not be an accurate one. Some of the cases that are tabulated as deaths by suicide may not appear clearly as such, and may not have been intentional, yet the fact that there was a knowledge that the action would be attended by danger to life induces me to place them among the suicidal deaths. I may mention as an instance of the uncertainty of classification the two deaths from abortion. It is reasonable to suppose that the two women who used instruments for the purpose of producing abortion did not intend to kill themselves, and that their deaths were accidental. Yet the well-known risk that attended the operation, and the bungling manner in which it was performed, producing death almost instantly thereafter, justify their inclusion among the suicides.

It is very difficult in a majority of cases of self-destruction to determine whether there was an insane impulse or delusion prompting it. In fact, there is no apparent cause for the commission of this act assigned or ascertained in a number of cases; nor is any mental or physical ailment apparent or noticed prior to the death of the person. In a majority of the cases, however, the causes of the suicide can be traced to abnormal physical or mental conditions, disappointments of various kinds, intemperance, business reverses, family differences, etc.

If we may form an opinion from the occupations of the decedents who

died by their own hands, the great majority of them were in the humble walks of life, and consequently possessed the education of their class.

There seems to be a diversity of opinion in regard to the causes or motives which impel people to commit suicide. Some writers attribute it to a certain kind of climate, others assert that in the fall of the year suicides are most prevalent in this country, others think that persons of certain religious beliefs rarely commit suicide, others think that no sane person would commit suicide, and others state that the natives of certain countries rarely commit suicide by certain means. All these statements do not appear to be well verified, or borne out by the statistics herewith submitted of self-murder in New York City. It is, however, reasonable to believe that some of the causes assigned have more influence upon the natives of one country than of another. This is possibly due to national habits and customs. There is no apparent reason why the Germans, who as a class are wealthier and more prosperous than the Irish, should so largely exceed the latter in suicides, unless it be the Teutonic national temperament. The Irish show a lesser number of suicides in proportion to their population than any of the other foreign born inhabitants of this city. Whether this be due to temperament, or to their habitual struggles with adversity and the vicissitudes of life in their own country, is problematical. In my opinion, the temperament, national characteristics, peculiarities, and customs of people have more influence on the causes of suicide than religion has. Home-sickness, which is stated as a probable cause by a writer on this subject, can hardly be admitted as a reason for self-murder by Germans or Irishmen, as there are not probably more than nine cities in Germany with larger German populations, and but one city in Ireland with a larger Irish population, than the city of New York. There can be no reason, consequently, why the natives of these countries should not feel as much at home in this city as they would elsewhere.

It is important to notice the disproportion between suicides of males and suicides of females. The number of males who committed suicide during the past eleven years was 1,193, while the number of females was but 328. The statistics show that suicide was much more prevalent among males than among females, and that during this period the proportion of suicides among males was 3.64 to every one among females, notwithstanding the female population is larger than the male.

The figures giving the proportion of suicidal deaths to the total population of this city since the year 1804, do not show that there was any epidemic of suicide in this city within this period, although some writers claim that there have been epidemics of suicide in foreign countries. The highest yearly rate of suicide in New York city during the past seventy-seven years was in 1805, when there was one suicide to every 3,017 inhabitants, and the lowest proportionate number was in 1864, when there was one suicide to 23,827 inhabitants. In 1874 the suicides were one in every 5,515 inhabitants. This was the largest proportion of suicides to the population since the year 1834, as will be seen by the following table, which gives the yearly comparison for the period stated:—

*Table Showing the Proportion of Suicides in New York City to the Estimated or Enumerated Population since the Year 1804.*

In 1804 there was one suicide in every 7,486 of the population.
In 1805 there was one suicide in every 3,017 of the population.
In 1806 there was one suicide in every 5,468 of the population.
In 1807 there was one suicide in every 5,351 of the population.
In 1808 there was one suicide in every 11,150 of the population.
In 1809 there was one suicide in every 15,461 of the population.
In 1810 there was one suicide in every 12,046 of the population.
In 1811 there was one suicide in every 11,012 of the population.
In 1812 there was one suicide in every 20,367 of the population.
In 1813 there was one suicide in every 9,507 of the population.
In 1814 there was one suicide in every 17,884 of the population.
In 1815 there was one suicide in every 22,007 of the population.
In 1816 there was one suicide in every 7,518 of the population.
In 1817 there was one suicide in every 6,417 of the population.
In 1818 there was one suicide in every 4,926 of the population.
In 1819 there was one suicide in every 4,480 of the population.
In 1820 there was one suicide in every 8,247 of the population.
In 1821 there was one suicide in every 8,224 of the population.
In 1822 there was one suicide in every 10,729 of the population.
In 1823 there was one suicide in every 8,127 of the population.
In 1824 there was one suicide in every 8,171 of the population.
In 1825 there was one suicide in every 11,653 of the population.
In 1826 there was one suicide in every 5,898 of the population.
In 1827 there was one suicide in every 7,779 of the population.
In 1828 there was one suicide in every 5,838 of the population.
In 1829 there was one suicide in every 5,899 of the population.
In 1830 there was one suicide in every 6,986 of the population.
In 1831 there was one suicide in every 9,287 of the population.
In 1832 there was one suicide in every 7,745 of the population.
In 1833 there was one suicide in every 7,854 of the population.
In 1834 there was one suicide in every 3,474 of the population.
In 1835 there was one suicide in every 8,884 of the population.
In 1836 there was one suicide in every 8,141 of the population.
In 1837 there was one suicide in every 6,659 of the population.
In 1838 there was one suicide in every 6,760 of the population.
In 1839 there was one suicide in every 6,704 of the population.
In 1840 there was one suicide in every 11,168 of the population.
In 1841 there was one suicide in every 9,794 of the population.
In 1842 there was one suicide in every 10,705 of the population.
In 1843 there was one suicide in every 19,135 of the population.
In 1844 there were no suicides stated.
In 1845 there was one suicide in every 20,706 of the population.
In 1846 there was one suicide in every 21,720 of the population.
In 1847 there was one suicide in every 14,209 of the population.
In 1848 there was one suicide in every 13,970 of the population.
In 1849 there was one suicide in every 14,150 of the population.
In 1850 there was one suicide in every 16,630 of the population.
In 1851 there was one suicide in every 16,040 of the population.
In 1852 there was one suicide in every 15,437 of the population.
In 1853 there was one suicide in every 10,803 of the population.
In 1854 there was one suicide in every 10,759 of the population.
In 1855 there was one suicide in every 10,509 of the population.
In 1856 there was one suicide in every 11,200 of the population.



In 1857 there was one suicide in every 10,059 of the population.  
 In 1858 there was one suicide in every 10,054 of the population.  
 In 1859 there was one suicide in every 13,997 of the population.  
 In 1860 there was one suicide in every 12,994 of the population.  
 In 1861 there was one suicide in every 18,599 of the population.  
 In 1862 there was one suicide in every 19,333 of the population.  
 In 1863 there was one suicide in every 17,233 of the population.  
 In 1864 there was one suicide in every 23,827 of the population.  
 In 1865 there was one suicide in every 20,746 of the population.  
 In 1866 there was one suicide in every 16,391 of the population.  
 In 1867 there was one suicide in every 10,454 of the population.  
 In 1868 there was one suicide in every 9,319 of the population.  
 In 1869 there was one suicide in every 9,095 of the population.  
 In 1870 there was one suicide in every 9,329 of the population.  
 In 1871 there was one suicide in every 8,374 of the population.  
 In 1872 there was one suicide in every 6,716 of the population.  
 In 1873 there was one suicide in every 8,303 of the population.  
 In 1874 there was one suicide in every 5,515 of the population.  
 In 1875 there was one suicide in every 6,721 of the population.  
 In 1876 there was one suicide in every 7,037 of the population.  
 In 1877 there was one suicide in every 7,225 of the population.  
 In 1878 there was one suicide in every 7,629 of the population.  
 In 1879 there was one suicide in every 9,381 of the population.  
 In 1880 there was one suicide in every 7,938 of the population.

The table showing the ages of suicides for the past eleven years presents some interesting features. It shows that during this period there were twelve suicides of boys and three of girls, whose ages ranged from ten to fifteen years, and that one man and two women aged from eighty to eighty-five committed suicide.

The oldest person who committed suicide during this period was a woman of German birth, aged ninety-one years and four months, for eleven years a resident of this city, who took her own life by severing the vessels of her arm with a razor. The greatest number of suicides among males were between the ages of thirty-five and forty years; among females between the ages of thirty and thirty-five years. The accompanying table will show the age and sex of suicides for each of the past eleven years.

## Age and Sex of Suicides in New York City during the Eleven Years ending December 31, 1880.

Years.	Between 10 and 15 years.		Between 15 and 20 years.		From 20 to 25 years.		From 25 to 30 years.		From 30 to 35 years.		From 35 to 40 years.		From 40 to 45 years.		From 45 to 50 years.		From 50 to 55 years.		From 55 to 60 years.		From 60 to 65 years.		From 65 to 70 years.		From 70 to 75 years.		From 75 to 80 years.		From 80 to 85 years.		From 85 to 90 years.		Total.
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
1870 . . . .			1		5	2	12	4	5	4	15	2	7	1	11	4	7	1	4	1	7	1	4			1						79	22
1871 . . . .		2	2	1	13	4	12	4	11	5	10	4	7		9	4	6	2	8		3		2		2							85	29
1872 . . . .	1		5	2	12	4	9	7	22	5	13	4	12	3	12	2	10	4	6	1	2		6		1							111	33
1873 . . . .	1		1	2	7	5	15	2	12	9	13	4	14	2	4	5	5	2	2	1	2	2	4		1							82	36
1874 . . . .	1		3	1	8	8	15	5	14	4	28	6	20	2	18	3	15	6	6	1	8	2	2	2	1							140	40
1875 . . . .			5	2	7	8	10	2	15	4	17	3	18	3	14	3	14	1	16		1	2	1	2	3							123	32
1876 . . . .			3	2	5	2	8	2	16	6	15	6	13	6	8	3	17	4	16	3	7	1	5		1							114	36
1877 . . . .	2		18	3	18	1	16	5	18	5	10	5	9	2	10	3	6	1	7		3		5		1							123	25
1878 . . . .				3	8	3	14	1	12	2	17	3	10	3	10	2	19	3	15	1	5	1	5	2								116	26
1879 . . . .		3	1	7	10	1	15	3	18	1	10	3	9	4	8	2	10	1	4		3	1	3									100	17
1880 . . . .	4		11	3	11	6	10	4	17	6	20	4	11	2	15	3	5	1	7	1	6	1	1	1	2							120	32
Total . . . .	12	3	56	19	104	44	136	39	160	51	168	44	130	28	119	34	114	27	91	9	47	11	38	9	12	4	5	3	1	2	1	1193	328

<sup>1</sup> Total whites, 1,518; colored, 3; males, 1,193; females, 328. Including one Chitaman, who poisoned himself with opium. Two colored males leaped from heights, and one colored female poisoned herself.

There is nothing to indicate that the climate of this city has any influence upon suicide. The deaths from this cause vary yearly in regard to frequency. In one year they are most numerous in the first quarter; in another year they are most numerous in the second quarter; while in other years their number may be greatest in the third or fourth quarter.

The summary of deaths from this cause in the past eleven years is as follows:—

First Quarter . . . . .	341
Second Quarter . . . . .	417
Third Quarter . . . . .	412
Fourth Quarter . . . . .	351

The second quarter, therefore, shows the highest, and the first quarter the lowest number of suicides. During these eleven years, however, there were but seventy-six more deaths in the highest than in the lowest quarter.

*Mortality from Suicides by Quarters in New York City during each Year for the past Eleven Years, showing the Sex and Condition by Years for the same Period.*

Year.	First Quarter.	Second Quarter.	Third Quarter.	Fourth Quarter.	Total for Year.	Sex.		Condition stated.		
						Male.	Female.	Single.	Married.	Widowed.
1870 . . . . .	23	22	33	23	101	79	22	26	49	13
1871 . . . . .	22	29	33	30	114	85	29	42	53	11
1872 . . . . .	33	34	45	27	144	111	33	50	69	17
1873 . . . . .	29	33	28	28	118	82	36	38	59	13
1874 . . . . .	55	28	52	45	180	140	40	55	88	15
1875 . . . . .	30	56	41	28	155	123	32	21	74	10
1876 . . . . .	33	46	41	30	150	114	36	31	86	16
1877 . . . . .	23	44	38	43	148	123	25	51	70	10
1878 . . . . .	33	29	41	39	142	116	26	42	83	9
1879 . . . . .	29	40	23	25	117	100	17	40	51	11
1880 . . . . .	26	56	37	33	152	120	32	34	77	12
Total Suicides . .	341	417	412	351	1,521	1,193	328	430	759	137

The means used for self-destruction during the above period are shown for years and quarters in the subjoined table. There are very slight discrepancies in a few of the totals in this table when compared with the table giving the causes by nationalities in detail. These discrepancies are occasioned by a double means of suicide, such as shooting or stabbing one's self, and jumping from windows, etc., etc. Such double means appear as single in the table.



### Means used for Self-destruction.

Including two deaths from the effects of immersion.

<sup>22</sup> Including two deaths from Gun-Shot wounds and Hanging.

The population of the city of New York in 1875 was 1,041,886. Of this number 1,026,632 were white and 15,254 colored; 506,922 were males and 534,964 females; 595,843 were natives of the United States and 446,043 natives of foreign countries. Of the native population (including the colored people) 199,862 were twenty years old and upwards. Of the foreign white population (the nativity and ages of the foreign colored population are not given in the census) 399,440 were twenty years old and upwards. The average annual rate of suicide during the past eleven years was 16.74 to every 100,000 of the native population twenty years old and upwards. During the same period the rate was 26.24 to every 100,000 of the foreign population of the same ages. There were 1,518<sup>1</sup> deaths by suicide among the white, and three<sup>2</sup> among the colored population.

*Table showing Rate of Suicides per 100,000 of the Total Population by Nativities, also the Rate in Native and Foreign Population, and in Males and Females Twenty Years Old and upward for Eleven Years, ending December 31, 1880.*

Nativity of Suicides.	Population New York State (Census 1875).	Suicides for Eleven Years.	Annual Average.	Average Rate of Suicides per 100,000 Inhabitants.
Austria . . . . .	2,678	6	.55	20.54
Belgium . . . . .	478	6	.55	115.06
British America . . . . .	4,985	15	1.36	27.28
Bohemia . . . . .	3,133	10	.91	29.05
China . . . . .	157	1	.09	57.32
Denmark . . . . .	798	5	.45	56.39
England . . . . .	26,913	82	7.45	27.68
France . . . . .	9,432	47	4.27	45.27
Germany . . . . .	165,012	626	56.91	34.49
Holland . . . . .	1,167	6	.55	47.13
Ireland . . . . .	199,084	213	19.33	9.71
Italy . . . . .	6,507	10	.91	13.98
Norway . . . . .	527	3	.27	51.23
Poland . . . . .	5,809	12	.09	18.76
Portugal . . . . .	93	1	.09	96.77
Russia . . . . .	2,099	3	.27	12.86
Scotland . . . . .	7,635	20	1.82	23.84
South America . . . . .	293	3	.27	92.15
Sweden . . . . .	1,870	8	.73	39.04
Switzerland . . . . .	2,244	19	1.73	77.09
Spain . . . . .	474	3	.27	56.92
United States . . . . .	595,843	368	33.45	5.61
Unknown, or not stated . . . . .	1,255	44	4.00	318.72
Wales . . . . .	667	1	.09	13.49
Cuba . . . . .	1,677	8	.73	43.53
Population twenty years old and upwards.				
Native (including all the colored) . . . . .	199,862	368	33.45	16.74
Foreign (white) . . . . .	399,440	1,153	104.82	26.24
Males . . . . .	289,579	1,193	108.45	37.45
Females . . . . .	309,723	328	29.82	9.63
Population 1880 { White . . . . .	1,186,144	1,518	—	—
{ Colored <sup>3</sup> . . . . .	20,433	3	—	—

<sup>1</sup> Including one Chinaman who poisoned himself with opium.

<sup>2</sup> Two colored men leaped from heights, and one colored woman poisoned herself.

<sup>3</sup> Including 747 Chinese, 18 Japanese, and 44 Indians.

Suicide is therefore less frequent among the colored people than among the whites. The table of nativities of the 1,521 persons who committed suicide during the past eleven years shows the rate of suicide to every 100,000 of the natives of the various countries represented in the population of New York City. The New York State census of 1875 has been used. In this table the natives of Belgium show the highest annual proportion of suicides to their population. During the eleven years six Belgians committed suicide out of a total Belgian population resident in this city in 1875 of only 478. The annual average number of suicides of this nationality was therefore 0.55, making the enormous annual rate of 115.06 suicides to the 100,000. The Irish show the lowest annual rate of suicide of any of the foreign born population — 9.71 to the 100,000. The other countries show the following annual average rates to the 100,000 of population, viz.: Austria, 20.54; British America, 27.28; Bohemia, 29.05; China, 57.32; Denmark, 56.39; England, 27.68; France, 45.27; Germany, 34.49; Holland, 47.13; Italy, 13.98; Norway, 51.23; Poland, 18.76; Portugal, 96.77; Russia, 12.86; Scotland, 23.84; South America, 92.15; Sweden, 39.04; Switzerland, 77.09; Spain, 56.92; Wales, 13.49; Cuba, 43.53; and the United States, 5.61, as the preceding table will show.

Probably as interesting a table as is presented is that showing the nativity of the 1,521 persons who took their own lives in this city during the past eleven years, and the means used by each. In this table some novel and curious means for ending one's life will be shown, as well as the relative frequency or rarity of suicide by the different methods stated. Among some of the rare or painful means used for self-destruction are the following: one person, a native of the United States, butted his head against the bars of his cell; one person, a native of Ireland, butted his head against a wall. A German beat his head with an oil-stone; another German beat his head with a paving-stone; another German forced his head through the railing of an iron bedstead; another German jumped into a water-tank; another of the same nationality jumped from a railroad train. A Scotchman jumped into machinery. Two Germans hanged and then shot themselves. Two Germans jumped into the river, were rescued, and died from the effects of the immersion. Four persons, an Englishman, a Pole, a Swede, and an American, placed themselves before railroad trains. Three persons, of whom two were of Irish and one of Swiss birth, strangled themselves with bandages or straps. One Englishman thrust his head through a pane of glass. One native of the United States inhaled ether, and one Frenchman inhaled charcoal gas. Three persons, one of German, one of American, and one of unknown birth, inhaled illuminating gas. Three natives of Germany ate phosphorus matches. Three other Germans took rat poison. One American, aged thirty-eight, a prominent merchant of this city, took his life by shooting himself and exploding a hand grenade, and was shot by five cartridges; his father, aged sixty-one, was killed at the same time by the explosion. One Englishman stabbed himself and then jumped from a window. The most common means of committing suicide was by poison, which caused the death of 503 persons during the eleven years. Paris green was



*Table of Deaths by Suicide in the City of New York, showing Means used for Self-destruction and Nationalities for Eleven Years ending December 31, 1880.*

Means used for Self-destruction.	Total Deaths.	Austria.	Bohemia.	Belgium.	British America.	China.	Denmark.	Demerara.	England.	France.	Germany.	Holland.	Ireland.	Italy.	Norway.	Poland.	Portugal.	Russia.	Scotland.	South America.	Sweden.	Switzerland.	Spain.	United States.	Unknown.	Wales.	Cuba.
Abortion by Instruments . . . . .	2				1																			1			
Butting Head against Bars of Cell . . . . .	1												1														
Butting Head against Wall . . . . .	1																										
Beating Head with Oil-stone . . . . .	174			1	4				9	5	73	1	32	1		2		1	4			1		41	10	1	
Cuts and Stabs (cutting throat, arteries, veins, &c.). . . . .	99		1	1				1	5	1	43	1	19					1	1				14				
Drowning . . . . .	237		1	2	2				10	4	137	1	23		1	2		2	1			4		37	10		
Forcing Head through Railing of Iron Bedstead . . . . .	1																										
Hanging . . . . .	2																										
Jump or Leap into River (effects of immersion) . . . . .	81		2						4	6	17	2	25	2		1		1	1				16			3	
Jump or Leap from Heights (windows, &c.) . . . . .	1																										
Jump or Leap into Water Tank . . . . .	1																										
Jump or Leap into Machinery . . . . .	1																										
Jump or Leap from Railroad Train . . . . .	1																										
Gun and Pistol-shot Wounds <sup>1</sup> . . . . .	395	3	3	1	1		3		11	17	160	3	25	6	1	4		3		1	4	6		125	13	4	
Gun and Pistol-shot Wounds, and Hanging . . . . .	2										2																
Placing themselves before Railroad Trains . . . . .	4																										
Strangling with a Bandage or Strap . . . . .	3												2														
Thrusting Head through a Pane of Glass . . . . .	1																										
Striking Head with Paving-stone . . . . .	1																										
Arsenic . . . . .	26	1		1							15		4											4		1	
Aconite . . . . .	1																										
Acid . . . . .	2										2																
Carbolic . . . . .	6																										
Hydrocyanic . . . . .	7												2		1									1	1		
Muriatic . . . . .	1										3																
Nitric . . . . .	1																										
Oxalic . . . . .	10																										
Prussic . . . . .	13				1				2		5		1														
Sulphuric . . . . .	4																										
Bi-chloride of Mercury . . . . .	3																										
Belladonna . . . . .	1																										
Chloroform . . . . .	10																										
Corrosive Poison (variety not stated) . . . . .	10								2		2		1											2	1		
Cyanide of Potassium . . . . .	18				1		2		1	1	4		2											5			

[illegible]

<sup>1</sup> One of these deaths was occasioned by a pistol-shot wound, followed by the explosion of a hand-grenade, by a native of the United States.

the most common of the poisons, and caused 200 deaths, the preparations of opium following with 139 deaths. Pistol and gun-shot wounds caused 399 deaths; hanging, 239; cuts and stabs (cutting throat, arteries, etc., with razors), 175; leaps from heights, windows, etc., 82, and drowning, 101.

The frequency of suicide by poison and the facility with which poison could be obtained, induced the State to pass a law regulating the sale of poisons. This law caused the passage of section fifteen of the Sanitary Code of the Health Department in regard to the sale of poisons, and also of a resolution of the Board of Health directing the Sanitary Superintendent to enforce it. The law regulating the sale of poisons, and the rules of the Board of Health in regard to it, are here submitted; but as it seems impossible to enforce the provisions of the law, there is little difficulty experienced in obtaining poisons, and hence the frequency of suicide by this means. There is no law for the prevention of the sale of fire-arms, and any person who has the means can purchase them, the only restriction being the city ordinance forbidding the carrying of concealed weapons without a permit. In order to prevent or decrease suicides by poison and fire-arms, it will be necessary to restrict the sale by imposing severe penalties. In regard to the other means used for committing suicide, remedial measures will easily suggest themselves.

Page 588 of the Report of the Board of Health for 1873 contains the following:—

#### POISONS.

##### TO DRUGGISTS, DEALERS IN PAINTS, AND OTHERS.

*Whereas*, The sale of Paris green is now very general, and suicides by persons with this material have become alarmingly frequent,

*Resolved*, "That the Sanitary Superintendent be, and that he is hereby directed to enforce section 15 of the Sanitary Code, and to cause a printed notice of the same, and of the State Law with regard to the sale of poisons, to be served upon all persons who keep this and other poisonous materials for sale."

#### SANITARY CODE.

SEC. 15. That no poisonous medicine, decoction, or substance shall be held for sale or sold, except for lawful purposes and with proper motives, and by persons competent to give the proper directions and precautions as to the use thereof; nor shall any bottle, box, parcel, or receptacle thereof be delivered to any person unless the same is marked "poison," nor to any person whom the party delivering the same has reason to think intends it for any illegal or improper use or purpose.

#### STATE LAW REGULATING THE SALE OF POISONS.

SEC. 7. It shall be unlawful for any person, from and after June 1, 1872, to retail any poison enumerated in schedules A and B, as follows, to wit:—

*Schedule A.*—Arsenic and its preparations, corrosive sublimate, white precipitate, red precipitate, biniodide of mercury, cyanide of potassium, hydrocyanic acid, strychnia, and all other poisonous vegetable alkaloids and their salts, essential oil of bitter almonds, opium and its preparations, except paregoric and other preparations of opium containing less than two grains to the ounce.



*Schedule B.* — Aconite, belladonna, colchicum, conium, nux-vomica, henbane, savin, ergot, cottonroot, cantharides, creosote, digitalis and their pharmaceutical preparations, croton-oil, chloroform, chloral hydrate, sulphate of zinc, mineral acids, carbolic acid, and oxalic acid, without distinctly labeling the bottle, box, vessel, or paper in which the said poison is contained, and also the outside wrapper or cover, with the name of the article, the word "poison," and the name and place of business of the seller; nor shall it be lawful for any person to sell or deliver any poison enumerated in said schedules A and B unless, upon due inquiry, it be found that the purchaser is aware of its poisonous character, and represents that it is to be used for a legitimate purpose. Nor shall it be lawful for any registered pharmacist to sell any poisons included in schedule A, without, before delivering the same to the purchaser, causing an entry to be made, in a book kept for that purpose, stating the date of sale, the name and address of the purchaser, the name and quality of the poison sold, the purpose for which it is represented by the purchaser to be required, and the name of the dispenser; such book to be always open for inspection by the proper authorities, and to be preserved for reference for at least five years. The provisions of this section shall not apply to the dispensing of poisons in not unusual quantities or doses upon the prescriptions of practitioners of medicine.

In all cases of death by violence in New York City the coroner is required to hold an inquest, and no body can be buried until a certificate of death is filed with the Board of Health, and a permit for burial obtained. By this means all the deaths by suicide are known. In regard to the returns in a number of the cities submitted for comparison; I cannot state their methods of obtaining these returns, whether they are complete or not, or whether all deaths from self-murder are included in their interpretation of the word suicide. The table which enables me to give the comparative statistics of suicide in two hundred and seventeen foreign and thirty American cities during the year 1880, has been compiled from official sources in response to requests made to American consuls and health officers and registrars of foreign cities, and to boards of health, health officers, city clerks, and registrars of American cities; and to these gentlemen I offer my grateful acknowledgments. I forwarded over six hundred requests to cities which contain ten thousand inhabitants or more, and received replies from three hundred and eleven. Several of these cities, however, failed to give the deaths by suicide, although other causes of death are stated. The cities that have responded I shall enumerate by countries, viz.: twenty-two returns of English and Welsh cities were received, but five of which stated suicides; one Tasmanian city stated no suicides; two Italian cities had suicides stated; of two Canadian cities one had suicides stated; one Indian city had suicides stated; of one hundred and forty-seven German cities one hundred and forty-five had suicides stated; of thirty-four Belgian cities nineteen had suicides stated; one French city had suicides stated; of two Danish cities one had suicides stated; of fifteen Swiss cities all had suicides stated; one Austrian city had suicide stated; two Dutch cities had suicide stated; two Spanish cities had suicide stated; one Norwegian city had suicide stated; one Bohemian city had suicide stated; one Hawaiian city had suicide stated; one Russian city had suicide stated; one Cuban city had

no suicide stated ; sixteen Irish cities had no suicide stated ; one South American city had suicide stated ; seven of eight Scotch cities had suicide stated ; one Swedish city had suicide stated ; two Australian cities had suicide stated ; seven of eight British South American cities had suicide stated ; thirty of forty-eight American cities (United States) had suicide stated. Among the American cities with population ranging between 12,000 and 503,298, which did not give the deaths by suicide, were Chicago, Ill., St. Louis, Mo., Cincinnati and Cleveland, Ohio, Albany, N. Y., Allegheny, Pa., Charleston, S. C., Wilmington, Del., Memphis, Tenn., Erie, Pa., and Augusta, Ga.

Of the cities with a population of more than 10,000 which responded and forwarded returns, the highest death-rate from suicide to the 100,000 inhabitants, in Germany was at Gera, with 92.01 ; in Scotland, Paisley, 6.12 ; in Sweden, Stockholm, 19.08 ; in Belgium, Omarganow, 65.41 ; in Spain, Madrid, 16.97 ; Australia, Melbourne, 16.73 ; Holland, Amsterdam, 7.14 ; Canada, Toronto, 3.59 ; Austria, Vienna, 31.67 ; Bohemia, Prague, 36.53 ; Norway, Christiania, 3.30 ; England, Newcastle-on-Tyne, 10.04 ; Wales, Merthyr Tydvil, 4.12 ; Italy, Bologna, 13.70 ; South America, Buenos Ayres, 4.43 ; Switzerland, Chaux de Fonds, 53.69 ; Russia, Odessa, 14.63 ; France, Havre, 23 ; India, Calcutta, 13.50 ; British Guiana, S. A., Upper Demerara River, 43.39 ; Hawaiian Islands, Honolulu, 42.51 ; United States of America, San Francisco, Cal., 37.65.

The table which shows the statistics of suicide in cities, I think, will strengthen my surmise that national traits, etc., have more influence on suicide than religion. In some Catholic and Protestant countries and cities the suicides vary considerably. In Catholic Spain they seem to be less than in Catholic Belgium, and in Protestant Germany they are much higher than in Protestant England and Scotland, as the returns indicate. Catholic Vienna had more suicides in proportion to its population than Protestant Berlin, and Catholic Paris had more suicides than Protestant London, and exceeded the total number that took place in Catholic Spain. Equally favorable comparisons can be made with other Catholic and Protestant cities.

*Number of Deaths by Suicide in 100,000 of the Population of American and Foreign Cities for the Year 1880.*

## AMERICAN CITIES.

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
New York . . . . .	New York . . . . .	1,206,577	152	12.59
Philadelphia . . . . .	Pennsylvania . . . . .	846,980	68	8.03
Brooklyn . . . . .	New York . . . . .	566,689	31	5.47
Fall River . . . . .	Massachusetts . . . . .	49,006	1	2.04
Newburyport . . . . .	Massachusetts . . . . .	13,600	1	7.35
Taunton . . . . .	Massachusetts . . . . .	21,213	2	9.42
Baltimore . . . . .	Maryland . . . . .	332,190	18	5.42
Stamford . . . . .	Connecticut . . . . .	11,298	2	17.70
Salt Lake . . . . .	Utah . . . . .	20,768	2	9.63
Richmond . . . . .	Virginia . . . . .	65,000	1	1.54
Syracuse . . . . .	New York . . . . .	54,817	3	5.47
Woburn . . . . .	Massachusetts . . . . .	10,938	1	9.14
Washington . . . . .	District of Columbia . . . . .	177,638	18	10.13
Hyde Park . . . . .	Illinois . . . . .	15,716	2	12.72
New Haven . . . . .	Connecticut . . . . .	62,882	5	7.95
Utica . . . . .	New York . . . . .	33,923	5	14.74
Yonkers . . . . .	New York . . . . .	49,000	1	5.26
Providence . . . . .	Rhode Island . . . . .	104,862	2	1.91
San Francisco . . . . .	California . . . . .	233,700	88	37.65
County of Hudson <sup>1</sup> . . . . .	New Jersey . . . . .	187,950	17	9.04
Indianapolis . . . . .	Indiana . . . . .	75,074	4	5.32
Pittsburgh . . . . .	Pennsylvania . . . . .	156,381	15	9.59
Dayton . . . . .	Ohio . . . . .	38,677	7	18.10
Milwaukee . . . . .	Wisconsin . . . . .	115,587	15	12.98
Savannah . . . . .	Georgia . . . . .	33,248	3	9.02
Omaha . . . . .	Nebraska . . . . .	30,000	6	20.00
Reading . . . . .	Pennsylvania . . . . .	43,280	4	9.24
Burlington . . . . .	Vermont . . . . .	11,364	3	26.39
Boston . . . . .	Massachusetts . . . . .	362,535	40	11.03

<sup>1</sup> Including Jersey City and Holoken.

Thirty American cities Suicide stated.

## FOREIGN CITIES.

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
Calcutta . . . . .	India . . . . .	429,535	58	13.50
Berlin . . . . .	Germany . . . . .	1,122,360	303	27.44
Breslau . . . . .	Germany . . . . .	272,529	101	37.06
Frankfort . . . . .	Germany . . . . .	136,829	43	31.43
Antwerp . . . . .	Belgium . . . . .	177,000	23	12.99
Havre . . . . .	France . . . . .	100,000	23	23.00
Copenhagen . . . . .	Denmark . . . . .	235,254	70	29.75
Dresden . . . . .	Germany . . . . .	220,216	87	39.51
Basel . . . . .	Switzerland . . . . .	61,399	14	22.80
Elberfeld . . . . .	Germany . . . . .	93,530	22	23.52
Vienna . . . . .	Austria . . . . .	726,105	230	31.67
London . . . . .	England . . . . .	3,769,395	352	9.34
Newcastle-on Tyne . . . . .	England . . . . .	149,366	15	10.04
Bologne . . . . .	Italy . . . . .	124,014	17	13.70
Bolton . . . . .	England . . . . .	105,400	5	4.74
Catania . . . . .	Italy . . . . .	92,670	9	9.71
Stuttgart . . . . .	Germany . . . . .	106,000	41	38.68
Crefeld . . . . .	Germany . . . . .	73,000	10	13.69
Nürnberg . . . . .	Germany . . . . .	98,619	33	33.46
Leipzig . . . . .	Germany . . . . .	147,276	84	57.04
Odessa . . . . .	Russia . . . . .	184,500	27	14.63
Geneva, with suburbs . . . . .	Switzerland . . . . .	68,935	26	38.21



*Number of Deaths by Suicide in 100,000 of the Population of American and Foreign Cities for the Year 1880 — continued.*

FOREIGN CITIES — *Continued.*

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
Zürich, with suburbs . . . . .	Switzerland . . . . .	75,152	24	31.93
Bern . . . . .	Switzerland . . . . .	43,749	18	41.14
Lausanne . . . . .	Switzerland . . . . .	30,026	15	49.95
Chaux-de-fonds . . . . .	Switzerland . . . . .	22,350	12	53.69
St. Gallen . . . . .	Switzerland . . . . .	21,239	9	42.37
Luzern . . . . .	Switzerland . . . . .	17,711	6	33.87
Neuchâtel . . . . .	Switzerland . . . . .	15,516	8	51.55
Winterthur . . . . .	Switzerland . . . . .	13,419	2	14.90
Schaffhausen . . . . .	Switzerland . . . . .	11,733	4	34.09
Fribourg . . . . .	Switzerland . . . . .	11,519	3	26.04
Biel . . . . .	Switzerland . . . . .	11,476	5	43.57
Herisau . . . . .	Switzerland . . . . .	11,025	3	27.21
Locle . . . . .	Switzerland . . . . .	10,461	4	38.23
Munich . . . . .	Germany . . . . .	228,000	38	16.66
Rotterdam . . . . .	Holland . . . . .	152,517	10	6.55
Buenos Ayres . . . . .	Argentine Republic . . . . .	270,708	12	4.43
Hamburg (State) . . . . .	Germany . . . . .	427,703	192	44.88
Strassburg . . . . .	Germany . . . . .	104,501	17	16.27
Magdeburg . . . . .	Germany . . . . .	97,259	55	56.55
Halle a. S. . . . .	Germany . . . . .	71,505	23	32.16
Frankfurt a. O. . . . .	Germany . . . . .	50,600	25	49.40
Görlitz . . . . .	Germany . . . . .	48,000	28	58.33
Potsdam . . . . .	Germany . . . . .	48,346	20	41.37
Spandau . . . . .	Germany . . . . .	28,902	11	38.06
Brandenburg a. H. . . . .	Germany . . . . .	28,685	6	20.91
Charlottenburg . . . . .	Germany . . . . .	30,446	11	36.13
Neust. Magdeburg . . . . .	Germany . . . . .	27,273	10	36.67
Guben . . . . .	Germany . . . . .	25,871	11	42.52
Kottbus . . . . .	Germany . . . . .	25,584	12	46.90
Dessau . . . . .	Germany . . . . .	23,266	8	34.38
Zeitz . . . . .	Germany . . . . .	18,268	7	38.32
Prenzlau . . . . .	Germany . . . . .	16,930	3	17.72
Burg . . . . .	Germany . . . . .	15,867	1	6.30
Hannover . . . . .	Germany . . . . .	122,846	35	28.49
Bremen . . . . .	Germany . . . . .	112,200	32	28.52
Altona . . . . .	Germany . . . . .	91,049	36	39.54
Braunschweig . . . . .	Germany . . . . .	72,573	30	41.34
Münster . . . . .	Germany . . . . .	40,429	9	22.26
Osnabrück . . . . .	Germany . . . . .	32,819	3	9.14
Bielefeld . . . . .	Germany . . . . .	30,519	4	13.10
Hildesheim . . . . .	Germany . . . . .	25,887	2	7.72
Celle . . . . .	Germany . . . . .	18,808	6	31.90
Lüneburg . . . . .	Germany . . . . .	19,045	10	52.50
Oldenburg . . . . .	Germany . . . . .	20,577	8	38.88
Harburg . . . . .	Germany . . . . .	19,075	5	26.21
Minden . . . . .	Germany . . . . .	17,868	7	39.17
Köln . . . . .	Germany . . . . .	144,735	12	8.29
Barmen . . . . .	Germany . . . . .	95,951	20	20.84
Düsseldorf . . . . .	Germany . . . . .	95,459	10	10.48
Aachen . . . . .	Germany . . . . .	85,720	5	5.83
Dortmund . . . . .	Germany . . . . .	66,546	17	25.54
Essen . . . . .	Germany . . . . .	56,957	10	17.50
Duisburg . . . . .	Germany . . . . .	41,259	15	36.35
M. Gladbach . . . . .	Germany . . . . .	37,384	3	8.02
Koblenz . . . . .	Germany . . . . .	30,567	7	22.90
Bonn . . . . .	Germany . . . . .	31,510	3	9.52
Bochum . . . . .	Germany . . . . .	33,432	2	5.98
Remscheid . . . . .	Germany . . . . .	30,043	3	9.98
Hagen . . . . .	Germany . . . . .	26,297	6	22.81
Trier . . . . .	Germany . . . . .	24,201	1	4.13
Viersen . . . . .	Germany . . . . .	20,998	1	4.76
Wesel . . . . .	Germany . . . . .	20,587	4	19.42
Witten . . . . .	Germany . . . . .	21,411	4	18.68
Hamm i. W. . . . .	Germany . . . . .	20,796	7	33.66
Mülheim a. R. . . . .	Germany . . . . .	20,300	2	9.85
Iserlohn . . . . .	Germany . . . . .	18,502	7	37.83
Oberhausen . . . . .	Germany . . . . .	16,677	1	5.99
Neuss . . . . .	Germany . . . . .	17,494	1	5.71

*Number of Deaths by Suicide in 100,000 of the Population of American and Foreign Cities for the Year 1880 — continued.*

FOREIGN CITIES — *Continued.*

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
Mülheim a. d. R.	Germany.	22,148	5	22.57
Solingen.	Germany.	16,800	1	5.95
Mainz.	Germany.	61,322	13	21.20
Mannheim.	Germany.	53,465	15	28.05
Karlsruhe.	Germany.	50,000	11	22.00
Wiesbaden.	Germany.	50,238	14	27.86
Metz.	Germany.	52,867	7	13.24
Darmstadt.	Germany.	49,000	13	26.53
Freiburg i. B.	Germany.	36,380	8	21.99
Offenbach.	Germany.	28,601	5	17.48
Pforzheim.	Germany.	24,037	8	33.21
Colmar.	Germany.	26,093	8	30.66
Heidelberg.	Germany.	24,421	6	24.57
Kaiserslautern.	Germany.	26,500	1	3.77
Hanau.	Germany.	23,041	8	34.72
Worms.	Germany.	19,035	9	47.28
Baden-Baden.	Germany.	11,927	3	25.15
Königsberg i. Pr.	Germany.	140,932	59	41.87
Danzig.	Germany.	108,549	32	29.48
Stettin.	Germany.	91,755	26	28.33
Lübeck.	Germany.	50,250	10	19.90
Kiel.	Germany.	43,956	14	31.85
Rostock.	Germany.	36,982	17	45.97
Elbing.	Germany.	35,683	15	42.04
Schwerin i. M.	Germany.	30,146	6	19.90
Stralsund.	Germany.	29,494	10	33.90
Flensburg.	Germany.	31,331	12	38.30
Stargard i. Pom.	Germany.	21,828	6	27.48
Thorn.	Germany.	20,618	8	38.80
Memel.	Germany.	20,209	6	29.69
Tilsit.	Germany.	21,394	4	18.69
Stolp.	Germany.	21,479	7	32.59
Greifswald.	Germany.	19,904	13	65.31
Insterburg.	Germany.	18,840	3	15.92
Graweuz.	Germany.	17,344	8	46.12
Posen.	Germany.	64,547	11	17.04
Liegnitz.	Germany.	37,168	13	34.98
Bromberg.	Germany.	33,618	12	35.69
Landsberg a. W.	Germany.	23,558	6	25.47
Schweinitz.	Germany.	22,136	9	40.66
Beuthen i. O. - S.	Germany.	22,812	4	17.53
Neisse.	Germany.	20,516	3	14.62
Gross-Glogan.	Germany.	18,629	7	37.58
Ratibor.	Germany.	18,233	3	16.45
Brieg.	Germany.	17,232	5	29.01
Augsburg.	Germany.	62,000	19	30.65
Regensburg.	Germany.	34,504	5	14.32
Ulm.	Germany.	32,800	16	48.78
Fürth.	Germany.	31,064	6	19.31
Heilbronn.	Germany.	24,516	7	28.55
Esslingen.	Germany.	20,758	8	38.53
Cannstadt.	Germany.	16,205	13	80.22
Reutlingen.	Germany.	16,609	5	30.10
Erlangen.	Germany.	14,876	9	60.50
Chemnitz.	Germany.	95,135	21	22.07
Kassel.	Germany.	58,293	20	34.31
Erfurt.	Germany.	53,272	24	45.05
Würzburg.	Germany.	51,024	8	15.68
Zwickau.	Germany.	34,998	6	17.14
Plauen.	Germany.	35,250	19	53.90
Halberstadt.	Germany.	31,258	14	44.79
Bamberg.	Germany.	29,622	7	23.63
Nordhausen.	Germany.	25,992	14	53.87
Freiberg i. S.	Germany.	25,547	11	43.06
Gotha.	Germany.	26,425	15	56.76
Altenburg.	Germany.	26,240	19	72.41
Glauchau.	Germany.	21,355	9	42.14
Meerane.	Germany.	22,234	5	22.49

*Number of Deaths by Suicide in 100,000 of the Population of American and Foreign Cities for the Year 1880 — continued.*

FOREIGN CITIES — *Continued.*

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
Gera . . . . .	Germany . . . . .	27,169	25	92.01
Mühlhausen i. Th. . . . .	Germany . . . . .	23,350	11	47.10
Zittau . . . . .	Germany . . . . .	22,473	12	53.39
Bayreuth . . . . .	Germany . . . . .	22,027	13	59.01
Hof . . . . .	Germany . . . . .	20,991	6	28.58
Crimmitschau . . . . .	Germany . . . . .	19,000	5	26.31
Weimar . . . . .	Germany . . . . .	20,130	8	39.74
Bernburg . . . . .	Germany . . . . .	18,602	9	48.38
Göttingen . . . . .	Germany . . . . .	19,942	6	30.09
Aschersleben . . . . .	Germany . . . . .	19,379	8	41.28
Omedlinburg . . . . .	Germany . . . . .	18,406	13	70.63
Weissenfels . . . . .	Germany . . . . .	19,648	11	55.98
Eisenach . . . . .	Germany . . . . .	18,788	5	26.61
Naumburg a. S. . . . .	Germany . . . . .	17,927	13	72.51
Koburg . . . . .	Germany . . . . .	15,790	6	37.99
Glasgow . . . . .	Scotland . . . . .	589,598	14	2.37
Edinburgh . . . . .	Scotland . . . . .	229,839	7	3.05
Dundee . . . . .	Scotland . . . . .	155,075	8	5.16
Aberdeen . . . . .	Scotland . . . . .	103,408	2	1.93
Greenock . . . . .	Scotland . . . . .	79,353	1	1.26
Paisley . . . . .	Scotland . . . . .	49,005	3	6.12
Leith . . . . .	Scotland . . . . .	58,479	3	5.13
Stockholm . . . . .	Sweden . . . . .	162,436	32	19.07
Brussels . . . . .	Belgium . . . . .	177,086	43	24.28
Ghent . . . . .	Belgium . . . . .	130,671	28	21.44
Liège . . . . .	Belgium . . . . .	128,300	18	14.03
Bruges . . . . .	Belgium . . . . .	48,498	6	12.37
Malines . . . . .	Belgium . . . . .	41,328	7	16.94
Verviers . . . . .	Belgium . . . . .	40,362	10	24.78
Louvain . . . . .	Belgium . . . . .	36,160	6	16.59
Tournai . . . . .	Belgium . . . . .	34,096	3	—
Namur . . . . .	Belgium . . . . .	27,455	7	25.49
Seraing . . . . .	Belgium . . . . .	27,237	0	—
Mons . . . . .	Belgium . . . . .	26,025	11	42.22
Alost . . . . .	Belgium . . . . .	21,780	1	4.59
Jumet . . . . .	Belgium . . . . .	21,265	1	4.70
Borgerhout . . . . .	Belgium . . . . .	20,800	4	19.23
Gilly . . . . .	Belgium . . . . .	18,168	2	11.01
Lockeren . . . . .	Belgium . . . . .	17,669	1	5.66
Charleroi . . . . .	Belgium . . . . .	17,539	3	17.10
Roulers . . . . .	Belgium . . . . .	17,082	1	5.85
Lierre . . . . .	Belgium . . . . .	17,035	5	29.35
Ypres . . . . .	Belgium . . . . .	16,949	1	5.90
Turnhout . . . . .	Belgium . . . . .	16,299	1	6.14
Renaix . . . . .	Belgium . . . . .	14,325	1	6.99
Hasselt . . . . .	Belgium . . . . .	12,477	1	8.01
Quaregnon . . . . .	Belgium . . . . .	12,230	8	65.90
Wasmes . . . . .	Belgium . . . . .	12,044	2	16.60
La Louvière . . . . .	Belgium . . . . .	10,636	1	9.40
Eclloo . . . . .	Belgium . . . . .	10,570	1	9.46
Dour . . . . .	Belgium . . . . .	10,190	1	9.81
Nivelles . . . . .	Belgium . . . . .	10,135	0	—
Melbourne and suburbs . . . . .	Victoria, Australia . . . . .	280,836	47	16.74
Christiania . . . . .	Norway . . . . .	118,000	4	3.38
Prague, Bohemia . . . . .	Austrian Empire . . . . .	156,000	57	36.54
Toronto . . . . .	Canada . . . . .	83,410	3	3.60
Merthyr Tydfil . . . . .	Wales . . . . .	48,500	2	4.12
Salford . . . . .	England . . . . .	171,727	9	5.25
Madrid . . . . .	Spain . . . . .	395,980	67	16.92
Gibraltar . . . . .	Spain . . . . .	18,014	2	11.10
Amsterdam . . . . .	Holland . . . . .	322,000	23	7.14
Liverpool . . . . .	England . . . . .	544,056	30	5.51
New South Wales . . . . .	Australia . . . . .	750,742	68	9.06
Georgetown . . . . .	Demerara . . . . .	34,819 <sup>1</sup>	4	11.49
Essequibo, West Coast . . . . .	Demerara . . . . .	22,647	2	8.83
Essequibo Islands and River . . . . .	Demerara . . . . .	13,328	2	15.00
Demerara, West Coast and West Bank . . . . .	Demerara . . . . .	23,741	3	12.63

<sup>1</sup> Estimated from 1880.



*Number of Deaths by Suicide in 100,000 of the Population of American and Foreign Cities for the Year 1880 — continued.*

FOREIGN CITIES — *Continued.*

City.	Country or State.	Population Estimated or Enumerated.	Number of Suicides.	Number of Suicides per 100,000 Inhabitants.
Upper Demerara River . . . . .	Demerara . . . . .	11,522	5	43.39
East Bank Demerara River . . . . .	Demerara . . . . .	13,501	4	29.63
East Coast Demerara . . . . .	Demerara . . . . .	32,008	—	—
East Coast Berbice, Canje and Corentyne Coast . . . . .	Demerara . . . . .	13,047	1	7.66
	British Guiana . . . . .	253,060 <sup>1</sup>	25 <sup>2</sup>	9.88
Honolulu . . . . .	Hawaiian Islands . . . . .	14,114	6	42.51

<sup>1</sup> Population 1871.

<sup>2</sup> Fifteen from hanging; five from poison; two from cuts and stabs; one from drowning; and two from other causes.

## XXVI.

### THE COMPARATIVE VITAL MOVEMENT OF THE WHITE AND COLORED RACES IN THE UNITED STATES.

By S. S. HERRICK, M. D.,

*New Orleans.*

THE relative vital movement of different races in a mixed population is a matter of interest to the sanitarian as well as the ethnologist. The white and colored races, living side by side in this country, and in some of the Southern States in nearly equal numbers, afford an example for study, though the problem is rendered complicated and indefinite by their partial admixture. The number of communities in which accurate records of deaths classified by races are kept is confined to a few of the cities and towns, and the record of births is still more limited, but enough is known to form a few tables that may be instructive.

Table A is designed to show the mortality for all ages, that for the first five years of life, that from some of the leading death-causes, and the births where attainable ; also the ratio of the same per one thousand of population by races.

It will be observed that the ratio of mortality for all ages is invariably much greater among the colored than among the white, and that the disparity is still more marked under five years of age. The same disparity is found in most of the diseases exhibited in the tables. In less than half the cities malarial fevers cause a smaller mortality among colored than white people, but the explanation would be neglect of hygiene and medical treatment rather than greater liability to malarial influences. It has been thought that the negro race enjoys, to a great degree, immunity from paludal miasms, but this is evidently a mistake, at least in this country.

There is good evidence that the African race is less liable to cancerous diseases than the European, and the same is true of delirium tremens in still more marked degree, though this cannot be attributed to more temperate habits. Suicide, too, is almost unknown among the darker race.

Pulmonary consumption and acute lung diseases are so much more destructive to life among the African race, that we must ascribe to that people a greater liability to these diseases. The same may be said of convulsions. Trismus nascentium, being almost uniformly fatal, clearly has a preference for colored people ; and besides is much more common in southern cities than in northern.

As to diarrhœal and puerperal diseases, it is probable that the advantage of the white population is due to better medical attention and superior comforts of life.

Still-births are uniformly and largely in excess among colored people ; but this may be, at least partially, accounted for by the better attention which white women enjoy during parturition.

Table B shows the ratio of mortality from the diseases specified to the total mortality, and the races are thus compared. Here we find that the colored race enjoys an advantage in malarial fevers and cancerous diseases, while it is at disadvantage in all the others.

It has long been known that the rate of mortality among the African race in this country is much greater than among the European, especially in the periods of infancy and early childhood ; and it was generally supposed, until the census of 1880 corrected the mistake, that the former would gradually be extinguished in a state of freedom. This idea was probably due, in great degree, to the known fact that the rate of increase among the free colored people was formerly only about one half that of the slaves, while the former were more intelligent and apparently better able to take care of themselves.

In the September (1881) number of the "Popular Science Monthly" is an interesting article on the "Increase of the Colored Population in the United States," by J. Stahl Patterson. From this are borrowed the figures for the following table, showing the relative gain per cent. of the white and colored populations in our country for each decade since 1790 :—

Decade.	White gain, per cent.	Colored gain, per cent.
1790-1800 . . . . .	35.8	32.3
1800-1810 . . . . .	36.0	37.5
1810-1820 . . . . .	34.1	28.6
1820-1830 . . . . .	34.0	31.5
1830-1840 . . . . .	34.7	23.4
1840-1850 . . . . .	37.7	26.6
1850-1860 . . . . .	37.7	22.1
1860-1870 . . . . .	24.8	9.9
1870-1880 . . . . .	29.2	34.8

Two important points are here to be noted : 1. That the foreign immigration since 1808 has been almost exclusively white ; and 2, that the great preponderance has been to the States where the colored race is least numerous. The white population of the sixteen Southern States and District of Columbia increased from 9,466,355 in 1870 to 12,577,215 in 1880, which indicates a gain of 32.9 per cent. During the same period the white population of the twenty-two Northern States increased from 23,864,272 to 30,257,557, showing a gain of 26.8 per cent. Between 1870 and 1880 immigration added to the white population of the North 2,160,000, and to that of the South 192,000. Eliminating this element of increase, we find the percentage of gain in the native white population to be 17.7 in the Northern States and 30.8 in the Southern. But Mr. Patterson makes allowance for children born in this country to these same immigrants during the last decade, by which he reduces the gain of the native whites of the Northern States to 15.7 per cent., and that of the Southern States to 30.4 per cent., or nearly double the former.



The inference from the foregoing figures is, that the increase of the colored is more rapid than that of the white population throughout the country ; and, as the colored mortality is markedly higher than the white, that the birth-rate of the African race must be greatly above that of the European. The exaggerated mortality of the colored race is most apparent during the period of lactation, and the natural consequence of this is a diminished interval between successive pregnancies. The greater prevalence of still-births has the same tendency.

But an important allowance must be made, which is overlooked by Mr. Patterson in his calculations. This grows out of a partial but constant amalgamation of the two races, the gain from which accrues almost entirely to the colored population. It is impossible to estimate this allowance with any degree of accuracy, for statistics are lacking ; but it is probable that the gain in the Southern States from issue of parents both white is scarcely less than that from issue of parents both colored.

Another fallacy in Mr. Patterson's estimate has reference to movement of the white population in the United States. His opinion is, that the removal from South to North is about equal to that in the opposite direction ; but this must be a great mistake. For many years the South has received a considerable immigration from the Northern States, the majority of the settlers being males, as is usual, in migrations. Thus the legitimate union at the South of Northern males with Southern females has served to compensate for the illicit cohabitations of white males with colored females, and this gain to the native white population of the South answers for a corresponding infertility in that of the North, where there is an excess of native females.

It is obvious that the fruitfulness of the native population of New England has suffered greatly by a long-continued drain of its most vigorous sons and daughters. How far this natural decrease of the birth-rate has been supplemented by systematic measures of prevention, I shall not attempt to conjecture. Such practices surely lead to the extermination of their contrivers by the operation of the law of "natural selection and survival of the fittest." We need not, therefore, apprehend that any part of our country will be depopulated, unless it should become unfit for human habitation, while the teeming humanity of the old world continues to send to our shores the most vigorous and prolific portion of its surplus.

The revelation of the last census clearly corrects the preconceived and general belief in the destined disappearance of the African race from this country in "the struggle for existence." Apparently, this race is increasing more rapidly than its white compatriot ; and, as the latter is reënforced by immigration, writers like the one already mentioned might suppose that the darker race is destined eventually to occupy mainly the more Southern States of the Union. But, when we consider that the mulattoes and quadroons are all reckoned as colored, it is evident that a considerable part of its gain should be subtracted, so that the ratio of increase among the whites at the South might not be less than that of the blacks.

If the rapid increase of the darker race proves anything, it proves that

there is plenty of room yet for that class of people ; in other words, a great demand for the products of their industry in the markets of the world. It is not probable that the demand for the four great staples of the South (cotton, sugar, rice, and tobacco) will soon be surcharged, but it is likely to be fully answered within fifty years, with the present increase of production. If by that time our darker countrymen have not learned other occupations, their increase will surely be repressed by the stern law of nature.

Whatever may be the capacity of the race for development in a state of peace, it is apparent, from the great check on their increase between 1860 and 1870, by the operations of the civil war, that any serious disturbance of their industrial pursuits, like a prolonged foreign war or political convulsions at home, would produce such distress as to disturb profoundly their vital movements. The same event would follow an over-production of the staples grown by their labor, owing to their habitual improvidence.

Thus far they have experienced no serious rivalry, and therefore no check to their natural increase ; for foreign immigrants have always shown a disinclination to come into close contact and competition with the dark-skinned race, and the repugnance is not likely soon to disappear. This fact is undoubtedly favorable to the numerical increase of the race, though it is equally clear that it tends at the same time to delay its intellectual improvement by deterring individuals from pursuing other and higher industries.

In any event there is little danger that either race will severely encroach on the ground of the other in our time, and no danger that the colored population of any part of the country will be in the way of the whites, unless they should so far advance intellectually and morally as to win a commanding position by sheer force of merit. In such a struggle for supremacy, if the white race should fail at last to maintain its present standing, the philosopher of the future will decide that it has been tried in the balance and found wanting.





TABLE B. Comparative Vital Movement of Races. Percentages of Mortality to Total Mortality of each Race.

	Malarial Fevers.		Pulmonary Consumption.		Acute Lung Diseases.		Diarrhoeal Dis- eases.		Heart Diseases.		Cancerous Dis- eases.		Puerperal Dis- eases.		Convulsions.		Trismus Nas- centium.	
	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.	White.	Colored.
Philadelphia, 1879	.0028	.001	.158	.166	.585	.101	.880	.045	.040	.091	.024	.009	.900	.006	.039	.053	.001	1
District Columbia, July, 1879-80	.017	.015	.16	.19	.103	.146	.102	.115	.04	.026	.024	.01	.009	.01	.017	.05	.900	.018
Richmond, 1880	.009	.006	.14	.18	.051	.094	.13	.068	.035	.043	.019	.005	.009	.000	.028	.055	.012	.014
Charleston, 1879	.015	.008	.155	.146	.091	.096	.106	.071	.027	.023	.015	.006	.006	.004	.025	.04	.021	.077
Charleston, 1880	.025	.016	.102	.104	.081	.10	.089	.091	.025	.021	.022	.008	.007	.008	.022	.052	.019	.10
Savannah, 1879	.077	.042	.127	.17	.072	.117	.086	.10	.031	.027	.005	.004	.002	.019	.040	.162	.029	.03
Atlanta, 1880	.007	.008	.142	.15	.08	.145	.173	.163	1	1	.021	.016	.003	.013	1	1	.003	.008
New Orleans, 1879	.046	.031	.144	.19	.057	.091	.122	.085	.04	.062	.021	.015	.006	.01	.025	.029	.024	.045
New Orleans, 1880	.064	.051	.142	.174	.059	.096	.096	.092	.037	.051	.028	.013	.01	.004	.028	.038	.032	.045
Memphis, 1880	.043	.042	.117	.137	.053	.09	.079	.096	1	1	.015	.016	.005	.008	1	1	.005	.01
Nashville, 1880	.014	.011	.14	.14	.062	.085	.113	.074	.045	.04	.014	.004	.004	.004	.016	.024	.054	.105
Louisville, 1879	.024	.015	.132	.233	.124	.142	.069	.053	.044	.04	.008	.002	.014	.01	.012	.093	1	1
St. Louis, 1880	.056	.034	.111	.172	.102	.151	.098	.095	1	1	.021	.007	1	1	1	1	1	1

## XXVII.

### INSIDE SOURCES OF DISEASE.

By DR. JOHN J. SPEED,

*Kentucky.*

To make the old familiar and the familiar new is said to be a triumph in writing or in public speech. Old and very familiar ideas may be placed in new relationship, and truth may be evolved from them which enter into and become a part of our philosophy of life.

As sanitarians, we dwell with especial emphasis upon all the conditions *outside* of the man, what we call his surroundings. Earth and air, light and drainage, and cleanliness, are words which we find everywhere, in books, in pamphlets, in public address, and in private speech, and they are not *words* merely. They are the words which are things; no respectable sanitation without them, infinite disaster without proper attention to them, not single diseases only, but pestilence comes in the wake of persistent disregard of them. But are there no other factors that enter into the conditions of man's best being? Is there nothing on the inside of the man, the outcrop of which tells upon his physical weal or woe? Are there no central fires quite as destructive, aye, infinitely more destructive than the miasmas which spring from August suns upon putrescent swamps? What say you to the appetites and passions? How shall we exclude *them* from our consideration of the sanitary influences which build up or pull down — enrich or pauperize — human organization, and thus shorten or prolong human life? While we assign all proper importance, then, to facts of man's surroundings, let us not forget that on the inside of him there are forces which tend largely to shape his destiny as a physical being, lifting him from better up to best, or poisoning and blighting the very sources of his vitality and blotching him with a curse as deadly and more far-reaching than the Egyptian leprosy, — and these diseases are preventable.

Let us look for a little at the eater — the human anaconda who eats to repletion and stupefies through digestion. Has he done a hygienic thing? Has he not done a very unhygienic thing, a thing, which, repeated, lays the foundation for more troubles than Pandora loosed from her fatal box?

What consideration has such an eater ever given to the fact that hunger and appetite are very different states; that hunger is natural, that appetite is artificial; that hunger is nature's demand for fresh building material; that appetite is a craving for the fripperies and gew-gaws of society life; that hunger is physiological, and appetite is pathological; the one easily appeased, the other well-nigh insatiate; that the one sustains and buoys and

carries you through the years ; that the other depresses and overwhelms you with a burden which you cannot bear — the one gives you renewed vitality and a physical satisfaction — the other gives you a morbid stimulation which, like the daughters of the horse-leech, constantly cries Give, give.

It is not necessary, in a presence like this, to make a picture of the dyspeptic, the doomed, the despondent, the pitiable spectacle of him whose stomach is forever crying remorse, remorse, nor of the gouty man whose feet tell of his table debauch, nor of the heart-troubled man, who dies daily, and is afraid of everything except his dining-room. All doctors are familiar with these miserable existences. Where are the Pontine marshes more disastrous than these feeding-halls which pander to stimulated appetites ?

By drainage you prevent the deadly emanations of the one ; what prophylaxes do your sanitary tracts suggest for the other ? You drain your marshes to prevent fever ; you vaccinate your child to prevent small-pox ; you quarantine the ship to prevent yellow fever ; what do you do for the man whose stimulated appetite demands all the products of all the continents ? You save to the family and to the State the vigorous young man and the beautiful girl by your speck of vaccine, and all men give you thanks. What do you offer to the insane eater who rushes headlong toward the precipice over which he drops into dyspepsia or gout, and then totters through life, a drivel and a show, a whining burden to himself and a tax upon society ? We talk about the remorse of the stomach. Why should the stomach feel remorse ? Remorse implies a consciousness of wrong-doing. *It* has done no wrong. Indeed, it has labored very faithfully to do exactly right. It has poured out its gastric juice and held steadily to its true motions month after month, and year after year, grinding every grist brought to it as long as the power lasted. It has prepared all conceivable things for enriching the blood, which went to brain and heart and lungs ; but now the power to turn all this confused mass into nutriment ceases, and you charge remorse upon the overworked old mill. It is the artificially stimulated palate, not the natural demand of the stomach ; it is the love of high-seasoned dishes, — the morbid appetite, — not the healthful hunger of the man. Let the worm bite there, and it does bite there, — the impoverished blood, the palpitating heart prove it ; and the disordered mental visions, the morbid conceptions, the vague apprehensions, the inability to think, the cowardly dread of unseen dangers, — all show where remorse is. The vulgar habit of much eating, driven by stimulated appetite, stands as the criminal before the bar of hygiene, and under law receives its punishment. Sanitation cannot abrogate the law, but with absolute certainty can prevent the crime. Infinitely simple is the advice, rather hard, perhaps, the acceptance and the practice of it : Satisfy your hunger, but don't sit an hour to gratify your appetite.

Dr. Beaumont has very clearly shown, in his experiments upon the soldier Alexis St. Martin, the distinction I make between hunger and appetite.

After an abstinence of longer than ordinary duration, when the demands of the organization had set up that peculiar sensation called hunger, Beaumont introduced, through the external opening in his stomach, the simplest form of food, and the sensation was allayed. No particle of food touched



the palate ; the appetite was not consulted, and yet hunger was appeased and the organism was satisfied. Leaving out altogether the multiplied experiences of medical men all over the world, this soldier experiment alone is enough to establish the physiological fact, that hunger is easily satisfied. Let sanitarians stick a pin there. The artificial appetite goes on in its cravings, dish after dish, each more highly seasoned than the last, peppers and mustards and Worcestershire sauces, horse-radish and cayenne pepper, each hotter than the other, till the whole organization is ablaze, which the victim attempts to put out by wines and spirits, which only add to the flame. Tell me this is rational? Is there sanitary law for this? Physiological law for this? Three hundred and sixty-five times in a year repeat this and live? Is it not a monstrous perversion of all reason, a square infraction of all law, and leading rapidly and with absolute certainty to disaster and overthrow? The reckless floater above Niagara is no more certainly nearing the fatal plunge than the lawless feeder whose whetted appetite drives him to his destiny? Is there no room here for sanitary law? no room here for preventive measures? Of all other sources of disease this fronts us most directly and most constantly. Those of us who attempt to teach health laws to the people have ground here for very emphatic speech. The pained faces of personal friends crowd upon every medical man who hears these words, friends who laughed an incredulous laugh years ago when cautioned against much eating. They were younger then and thought that their stomachs would last forever. Just as the young spendthrift who has inherited a few thousands imagines that no possible lifetime can exhaust his fortune, and yet who, by a few years of riotous living, has become a bankrupt, so this splendid digestive apparatus which at twenty-five feels all sound and capable of standing any sort of draught, any sort of imposition, finds the sad mistake disclosing itself slowly but very surely. The clouds gather, the winds come from their secret hiding-places, the storm bursts upon the *appetite victim*, and he is overwhelmed and helpless ; helpless and miserable ; miserable beyond the reach of medicine. Don't we all recognize the pitiable creature? Insatiate desire for food, with no ability to manage and no resolution to resist it. Like the young spendthrift, he is a bankrupt, a spectacle to be pitied, a driveler and a show. It is the necessary result of violated law. Law is inexorable, and its infraction brings punishment with the certainty of destiny, and that destiny is not far to seek, and not at all uncertain is the highway leading toward it. Bowed and haggard and weary is the crowd which presses on and on, driven by a Nemesis pitiless and unrelenting ; melancholy spectacle to health congresses and State boards and common-sense men. Blind infatuation drives him to deeper depths and lays up a keener remorse. "Lucullus sups with Lucullus to-night." The markets of the Eternal City had been searched for all that was rare, the culinary art was taxed to its utmost, the banquet was spread in the gorgeous hall, and the liveried servants announced that all was ready, but where are the guests? "Lucullus sups with Lucullus to-night," said the old Roman gourmand. That race is not extinct. The world's markets are taxed and the tables groan under an exuberance which would have astonished the

Roman debauchee, and these tables are sought by men who are recognized gentlemen. If they were not known as gentlemen the outside world would call them gluttons. Money and markets and cooks and rich condiments pander to their orgies in public restaurants and gilded saloons. Lucullus habits have seized upon this continent, and foreign writers brand us as we deserve. May we not erase the brand? May not sanitarians put down dyspepsia and gout among preventable diseases? Unquestionably, if any diseases are preventable by hygienic usage, these two, in all scientific and in all common-sense view, must take high rank on the list.

There is another aspect of this question which I wish to emphasize before this Health Association.

Whatever organ may be involved, if the malady is at all grave, we all look to a good digestion for hope. Thus the stomach becomes the best therapeutic agent we have. While all other organs are in their place supreme, it is to the digestive functions that we look for continued and healthful action. Take a case of phthisis — pulmonary consumption. You do not medicate the lungs; all your remedies and your regimen are addressed to the stomach; suppose it revolts; what is your oil, and whiskey, and beef worth, if the stomach fails to furnish the building material in such shape that the lacteals take it up and the organism appropriates it? With all the 2,000 drugs of the pharmacopœia and all the skill of the most accomplished doctor, your case of phthisis goes steadily down when the digestive powers have failed. Tubercular consumption is so intimately associated with the status of the stomach that it would not be far wrong to reduce to an axiom this: given a good digestion and tubercle is impossible.

Take a case of scrofulous ulcer. Do you doctor the ulcer? The *hoi polloi* do? But do educated physicians? Do you prescribe patent and neighborhood salves or powders to heal up a sore, back of which stands and works a vitiated organization? Is not there a force back of the visible morbid result which is constantly spending itself upon glands and joints and tissues — a force which first makes the ulcer and after keeps it open? A healthy wound you may rapidly close up by adhesive inflammation or granulation, but this is a healthy wound; all the forces tend to restoration; but an ulcer which is the result of blood vitiation you don't expect to close by local interference. You want to make good blood, and good blood will carry material for repair, and that reparative material is the only salve which closes up your scrofulous trouble. Now, in order to thus better blood, you must depend upon digestion and assimilation, and here you see coming to the front the stomach as a therapeutic agent. Very surely if you have not a good digestive apparatus your case of knee-joint or glandular swelling or other scrofulous development is not in the way of recovery.

I think we may safely claim that the stomach at last is the great re-builder of broken down organization. If the stomach is also broken down, where is the hope for your dilapidated structure? It is a wreck, and presently goes to dust. Let us adopt preventive measures. Then, preserve digestion at its best and take off from the list of causes this habit of over use.

Let us look for a moment at another force on the inside of the man, — a terrific force, which, misdirected, not only vitiates and brands the man, but pollutes and poisons the generation which comes after him.

No philosophy, no morals, no medicine, no sanitation is at all complete which does not recognize and give prominence to sexual passion. We cannot ignore it if we would. It is among the great modifying influences of human character; it is sometimes the dominant influence in both man and woman. As medical men, and as personal friends, we all know what disaster is wrought in the life over which it exercises supreme control. Now, as medical man, as sanitary counsellor, what are you going to do with your young friend? Have you any preventive measures by which to ward off blood poisoning, and a blotched skin, and bones full of a rheumatic torture? You talk about drainage to fight off malaria and you are right. What do you say to this hideous spectre? — spectre did I say? No, this terrific reality. Unquestionably the answer is, Subdue the passion; fight it as an enemy to health; fight it by all hygienic appliances physical and moral; fight it in its earliest assaults upon your strongholds and drive it into submission; make no compromise; you must conquer it or be conquered by it; and when it *has* conquered it will write upon you in letters of fire the one word Libertine, and the Nemesis of violated law will stalk beside you with a very pitiless revenge.

The remedy is within you. You must recognize this great evil as preventable. Don't attempt to ignore it or dodge it; meet it squarely; grapple it; throttle it. I know how glibly the debauchee talks about Providence as the giver of his appetites and passions. Yes, I know all that. Passion is an original implantation, and its exercise perpetuates the race. But while this world is God governed, it is also law governed, and the law is, *that undue use of natural and God-given powers sets up a fire which shall consume you*. Obedience to law rests with you, and this is the sanitarian's preventive.

Morals, do you say? I say, Yes, sir. We cannot dodge responsibility by claiming that it is not our business to teach morality. I tell you, as a hygienist, we are bound to teach it. There is no complete sanitation without a moral life. It is as much a part of hygienic living as exercise, or cleanliness, or sleep.

If the nettled skeptic with his morbid life burden chooses to regard it as a terrific philosophy, putting moral restraint upon his personal freedom, I tell him Yes, that is exactly true, and if you reject the restraint you do it at your peril. The debauchee who has vitiated his organization by unphysiological living must come under a higher law than that of animal passions, and so long as he is in sanitary hands the sanitarian is his law-giver. He may call it transcendental morals. I call it philosophic hygiene. It may require at times some nerve to do it, but this is not the only occasion in life where it requires some nerve to do the right thing. But would the professional hygienist feel like a *man* if, with clear convictions, he had failed to do the right thing, and by reason of his cowardice had suffered the wrong to triumph? Very much less than a man I think, if in our own chosen



field we should suffer brutal passion to beat back and put to rout our high and true professional convictions. To stand still and dumb and let life in its wildest debauchery run riot is not by any means a part of hygienic philosophy. Sanitarians do not propose to put off their armor and surrender at will to the skeptic who scouts all moral teaching and flings defiance in the face of physiology and experience and the common decencies of a high civilization.

Now sir, I claim that these are diseases within the purview of preventive medicine, and as legitimately the subject of consideration by this Association as malaria or small-pox; that they are more certainly under man's control than any of the generally accepted preventable diseases about which we write, and about which people read.

Captious criticism is asking through the public press for something practical—something we can understand. I tell you two of the most formidable diseases which blight humanity are directly under your own control. Can unguarded and impassioned humanity understand that? Will carping skepticism deny that this is practical? Proof, do you say? Hold your own nature up by the side of the facts which present themselves every day, and under the glare of such facts read the law which says thou shalt *not*, with quite as much emphasis as that other which says thou shalt—laws which are older than parliaments and congresses. Congresses and parliaments are themselves the products of law; law as old as human nature, and inground in human organization. Not practical? Is the conflagration which follows tinder under flint and steel, practical? Something to understand! Can you understand the disaster to your Mississippi coast which comes from inundation at its source and along the whole line of its turbulent flow? Anything practical in that?

Sanitarians are essentially practical. I am not claiming any impossible things. I do not indorse any human perfection. Humanity is essentially imperfect, and through all this life walks with faltering step. The great mistake made by Chateaubriand and Madame De Staël and Fontanes, who taught the perfectibility of man, lies in the fact that man is *finite*. To be finite forbids perfection; but so far as imperfect humanity *can*, we propose to forbid the causes of disease, and just so far make disease impossible. The idle critic who imagines that hygiene proposes to bring human life back to a thousand years, is more visionary and irrational than the wildest hygienist who has written or spoken outside of insane asylums.

The hypercriticism which taunts us with utopian schemes and sneers at incomprehensible diagrams, cannot fail to recognize these as preventable diseases, nor can it ignore the preventability of that crowning infamy of human habits, the habit of strong drink—the source of more disease than all the Pontine marshes of the world. Skepticism will surely stand dumb in the presence of such a practical fact as that. Then stand side by side with us to *prevent that*, and pæans will go up from all the earth in praise for a plague stayed, and the heart of humanity will invoke a blessing on those who stay the desolation. The spirit of him who doubts in the face of all that sanitation has accomplished in the last fifty years is a regular transmi-

gration of him who repudiated Jenner and his vaccine ; who sneered at Franklin, and scouted his philosophy and his kite ; who, coming down through the generations scouted Stephenson and his locomotive ; and later still, who doubted Morse and his telegraph ; who only the other day scouted Bell and his telephone ; what are those powers now ? Chief factors in the commerce and social life of the world. This embodied metempsychosis is still sitting by the roadside of the world's civilization crying, Woe ! woe ! and for its persistent fogysm gets itself covered with dust from the wheels of progress. There it sits waiting for the grave-digger and the last sad words, Dust to dust !

Skepticism will have its day, and in the exercise of the highest gifts we have in furthering the best interests of humanity, we are not exempt from the infidel's sneer. The world, leaving out the infidel, is beginning to see that the introduction of sanitary science has opened up a new chapter in human history. That history will be read in after times with admiration and amazement. Admiration for the wise forethought of a brave doctorhood ; amazement at the possibility of opposition to a measure so beneficent and so far reaching.

Those who are making history here to-day are not reaching out with ungoverned enthusiasm toward any physical millennium. They *do* look toward a lessened mortality and a stronger life for man. To this end the people must join hands with doctors in a persistent work. When Mr. Jefferson said that eternal vigilance was the price of liberty, he uttered a truth wider than he knew. Eternal vigilance is the price of health as well. The great cypress tree of Sparta, in the pride of its strength before the Christian era, and perfect in its age at the end of 2,500 years, was destroyed in a day by the recklessness of a gypsy camp and the want of vigilance in the people of Sparta. So, however vigorous your health, and however perfect your surroundings, a recklessness like the gypsies, and a carelessness like that of Sparta, may compromise it all in a day.

## XXVIII.

### "THE KANKAKEE;" A SANITARY PROBLEM OF INDIANA.

By PROF. JOHN L. CAMPBELL,

*Crawfordsville, Ind.*

THE northern portion of the State of Indiana presents some questions, relating to topography and drainage, of special interest.

From Lake Michigan to the Wabash River the northwestern part of the State is generally level; and while a considerable portion of this section is under cultivation, there are vast tracts of marshy lands, as yet wholly unredeemed.

These flats are for the most part covered with shallow water, and from the slimy, black mud there comes a rank growth of grass, weeds, brush, and scrubby trees.

Prominently through this mixture of soil, water, and wild growth, runs the Kankakee River, whose sluggish current and numberless windings make it seem like a great snake asleep. The stream abounds in fish, ducks, and frogs, and the enthusiast regards it as the sportsman's paradise.

Sometimes the grass on the broad flats may be cut for wild hay of an inferior quality, and here and there the cranberry and whortleberry flourish, but generally the acres are useless.

Except for the friendly south wind to the great northern lake, and the broad prairies, as efficient sanitary agents, the miasms arising from the decaying vegetation would make the vicinage a very region of death.

The reclamation of this region is the economic and sanitary problem to be discussed in this paper.

The general topography of the northwestern part of the State of Indiana, presents a plain gently sloping to the west. The summit of this plain is near Fort Wayne, and the drainage of the larger portion of it is into the Wabash River, which extends quite across the State, and runs in a channel averaging one hundred and fifty feet below the general surface. A limited section of the territory is drained by the St. Joseph, and other smaller streams which empty into Lake Michigan.

The Kankakee region lies between the Wabash and Michigan sections, and the outlet for it is through the Kankakee and its tributaries to the Illinois River, and thence to the Mississippi.

The Kankakee takes its rise only a few miles from South Bend on the St. Joseph River, and runs nearly parallel with the border of Lake Michigan, — distant from the lake from twenty to forty miles.

Along the borders of this river and its tributaries lie the great marshes.



The expense of reclamation of these marshes would be too great for individual enterprise, and a part of this expense must be borne by the State at large whenever the work is undertaken.

The Legislature of 1880-81 made an appropriation for a survey, and the governor is authorized to employ a competent engineer for the purpose of determining the most feasible method of accomplishing the result desired.

The principle features of the question may be obtained from a survey made by a Catholic priest, Father Stephan, for the Kankakee Navigation Company; from the preliminary reconnoissance made by Major Jared Smith, of the United States Engineers, with reference to the improvement of navigation; and from the surveys of the various railways which have been constructed across this section.

According to Father Stephan, the length of the Kankakee River from its source to the State line between Indiana and Illinois, is two hundred and thirty-seven miles, and the surface declivity is about three tenths of one foot per mile.

If the channel of the river were straightened the length would be only eighty miles, and the fall per mile would be increased to one foot. A short section of the river from English Lake to the crossing of the Louisville, New Albany and Chicago Railway, copied from Father Stephan's map, shows how crooked the channel now is.

According to the same authority there are two thousand bends in the State.

Contrary to common belief the Kankakee marsh country is a comparatively elevated plateau, and is susceptible of perfect drainage and reclamation.

The following table gives the elevations referred to sea levels:—

Source of the Kankakee River . . . . .	710
Pittsburgh, Fort Wayne and Chicago Railroad, Kankakee River . . . . .	667
English Lake, Kankakee River . . . . .	664
Louisville, New Albany, and Chicago Railroad, Kankakee River . . . . .	661
State Line, Kankakee River . . . . .	626
Momence, Ill., Kankakee River . . . . .	622
Wilmington, Ill., Kankakee River . . . . .	548
Ottawa, Ill., Illinois River . . . . .	448
La Salle, Ill., Illinois River . . . . .	439
Peoria, Ill., Illinois River . . . . .	433
Mississippi River, mouth, Illinois River . . . . .	410

The profile of the Louisville, New Albany, and Chicago Railway from Lafayette to Michigan City, gives a good cross section of the country from south to north.

This table is reduced also to sea levels.

Wabash River at Lafayette . . . . .	511
Brookston . . . . .	685
Chalmers . . . . .	710
Reynolds . . . . .	697
Bradford . . . . .	678
Francisville . . . . .	684
Medarysville . . . . .	690

San Pierre . . . . .	705
Kankakee River . . . . .	661
La Crosse . . . . .	680
Wanatah . . . . .	732
Westville . . . . .	789
Otis . . . . .	749
Lake Michigan . . . . .	585

The profile of the Pittsburgh, Fort Wayne, and Chicago Railway likewise gives a good cross section in a general east and west direction.

Summit near Plymouth . . . . .	852
Kankakee River . . . . .	667
Hamlet . . . . .	669
Wanatah . . . . .	732
Valparaiso . . . . .	739
Wheeler . . . . .	667
Hobart . . . . .	624
Chicago . . . . .	590
Lake Michigan . . . . .	585

The profiles of the other railway lines give essentially the same elevations, and show satisfactorily the general situation of the surface.

The lowest level reported is 626 feet above the ocean, and the entire country east of the Louisville, New Albany and Chicago Railway is over 660 feet higher than sea level.

The Wabash River south of the marsh country shows the following elevations:—

Wabash River at mouth of Eel River . . . . .	583
Wabash River at mouth of Tippecanoe . . . . .	516
Wabash River at Lafayette . . . . .	506

The St. Joseph River at South Bend has an elevation of feet.

These levels show that the problem of drainage is resolved into the engineering question of routes to the various possible outlets.

By straightening the course of the river the length in the State can be reduced more than one half, and the surface declivity doubled.

This improvement would give greater rapidity to the current, and it is claimed that the increased flow would keep the channel free from the grasses which now so seriously impede its progress.

It is the opinion of some persons who have examined the country that a new channel could be made at less expense than will be required for straightening the river along its present bed.

In addition to this straightening there is a necessity, doubtless, for lowering the bed of the stream in order to secure satisfactory drainage of the adjacent level lands. The absence of bluffs or banks shows that the bed of the river is very near the general surface, and unless the main channel is considerably lowered there will be no material improvement in the flow of the lateral streams upon which the drainage chiefly depends.

If the bed of the Kankakee River can be lowered twenty feet, the marshes will disappear, and the entire area will be converted into the best quality of upland.

A partial remedy for the upper part of the section may be found by

opening a deep channel from Mud Lake up the present channel of the river to the source, and across the dividing ridge a few miles to the St. Joseph River at South Bend. This would reverse the direction of the flow and create a new tributary to the St. Joseph, and would fairly drain a considerable part of the marsh lands.

Another suggestion is the changing of the outlet of Yellow River by cutting a new channel to the Tippecanoe River, thereby reversing the current and making an outflow from English Lake to this new tributary to the Tippecanoe.

A more important suggestion, probably, is the opening of a new channel direct from the Kankakee below English Lake by a short cut to the Monon, a tributary to the Tippecanoe River, which would give a direct south outlet to the Wabash.

The difference in level between English Lake and the Wabash at the mouth of the Tippecanoe is one hundred and forty-eight feet, and the distance about fifty miles, giving the splendid average fall of three feet per mile.

If the improvement is practicable, the drainage, by the new river to the Wabash, will be effectual.

As an economic measure the value of the territory reclaimed will more than compensate for the outlay that will be needed to make the improvement and the redeemed acres will soon repay in wheat and corn the entire cost of recovery.

This country lies at the threshold of the chief city of the northwest, and it is crossed by the railway lines over which must pass a large part of the commerce of the nation, so that both pride and profit enter into the question of converting barren wastes into sightly and productive plains.

As a sanitary question its importance cannot easily be overestimated.

The diminution of malarial diseases has been in direct proportion to the improved surface drainage, and it cannot be doubted that the recovery of the marsh lands will still further contribute to the healthfulness of the State.



## XXIX.

### IMPURE WATER AND ITS DANGERS.

By MOSES T. RUNNELS, M. D.,

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THERE is to day no question pertaining to sanitary science of greater importance to the public health than that of the *quality* of water used to sustain human life. Modern civilization has imposed upon man requirements and refinements which demand a plentiful supply of water. Only the *quantity* of water seems to have occupied the minds of those whose duty has been to supply water, and very little attention has been given to the *quality* of the water supply entering into the daily domestic economy. From a report on the Army and Navy Diet Scales I find: "The estimated quantity of liquid of all kinds drunk in the two services averages  $187\frac{1}{2}$  gallons per head per annum, or about two quarts per day. Though this quantity is drunk by adults of the male sex, it is some criterion of the quantity drunk by men, women, and children, and it will not be wrong to assume that two thirds, or 125 gallons per head, is as much as is actually consumed by a mixed population in one year." Dr. Parkes says that "an adult requires daily from seventy to one hundred ounces (three and one half to five pints) for nutrition, but about twenty to thirty ounces of this quantity are sometimes in the solid food." If we consume every day such a quantity of liquid to nourish our bodies, we should be careful to have every mouthful pure and wholesome. If the "model man weighs 154 pounds, of which 116 is water and only thirty-eight pounds dry matter," we may in fact say that we are, in one way and another, nearly all water. It is surprising that more thought is not given to the purity of water supplies, when three quarters of our bodies and a large part of our daily food are made up of water. It is a large factor in organic chemistry, and its quality must henceforth be a subject for critical examination by sanitarians, if zymotic diseases are to be brought under subjection and greatly diminished. Many years ago the pollution of the water courses began to arouse public attention in England, and Parliament appointed several rivers pollution commissioners and other sanitary committees to examine the water supplies, determine the standard of purity for potable water, and point out the dangers to be feared by the use of water polluted by sewage. The second English Rivers Pollution Commission, after the examination of some two thousand samples of water claimed to be drinkable, condemned river water, because it was liable to contamination from drainage of cultivated land, towns, and manufactories. It was the opinion of the Commission that the "admixture of even a small quantity of the infected discharges of persons suffering from cholera or typhoid fever with a large

volume of drinking water is sufficient for the propagation of those diseases among persons using such water." Human excremental matter is considered to be the most dangerous organic substance which has yet been found in drinking water, and its death-producing qualities are greatly increased whenever excrementitious matter of cholera or fever patients finds its way into the water supply. It is certain that impure water, rendered so from any cause, is liable to bring on disease. If the water is filtered or boiled it is rendered purer, and its power to do harm is greatly lessened. Generally it is only after the harm has been done — when sickness and perhaps death has been caused by the unsuspected filthy water — that measures are taken to find out where the disease originated. It is often the most difficult task for one who is not well informed of the dangers to be feared from impure water to fix upon the origin of any kind of fever. In a given case, the house may be supplied with all that taste could suggest or gold procure, and no fault can be charged to the kitchen, cellar, or sewer pipes, but on the examination of the back yard there will be found a surface-dug well, a privy vault, and a cess-pool in close proximity. From the well all water for family use has been drawn, and you will be told that the water is pure — "always looking clear and tasting sweet." On making a chemical analysis of the water you will find unmistakable evidences of sewage contamination. Human excrement from the privy and urine carelessly thrown into the gully holes about the yard have been the means of infecting the water to a dangerous degree. If from no other cause, the wholesomeness of the water may be destroyed by water from the kitchen, containing vegetable, animal, and almost every kind of refuse, and the water from the wash-house, containing soap and animal matter from soiled linen, or the drainage from the stable may bring to the well animal and vegetable offal. A great many people seem to think that a small mixture of pollution from the worst sources can do no harm. Some intelligent physicians have advocated the theory that the most impure water will be made pure by filtration through a few feet of earth, and that a dug well located within ten or twenty feet of a privy vault or cess-pool is not liable to be contaminated by animal matter. From recent experiments, Professor Pumpelly has ascertained "*that sand interposes absolutely no barrier between wells and the bacterial infection from cess-pools, cemeteries, etc., lying even at great distance in the lower, wet stratum of sand. And it appears probable that a dry gravel, or possibly a dry, very coarse sand, interposes no barrier to the free entrance into houses built upon them, of these organisms, which swarm in the ground air, around leaching cess-pools, leaky drains, etc., or in filthy made ground of cities.* That a house may be built on a thoroughly dry body of sand or gravel, and its cellar may be far above the level of the ground-water at all times, and it may yet be in danger of having the air of its rooms contaminated by the germs from leaching cess-pools and vaults; for, if the drift of the leaching be toward the cellar, very wet seasons may extend the polluted moisture to the cellar walls, whence, after evaporation, the germs will pass into the atmospheric circulation of the house." These facts prove conclusively that the ordinary dug wells of towns and cities generally contain water poisoned, to a great or

less degree, by sewage, and the use of such water for domestic purposes should be prohibited by law. Southern cities that consume from five hundred to five thousand barrels of pork and four times as many kegs of lager beer and gallons of whiskey each day in the year, while they confine forty or fifty per cent. of their population in stifling tenement houses, school-rooms, and workshops, and instead of providing pure water for drinking or bathing, permit water supplies to be drawn from open wells and rivers fed with sewage, or from neglected cisterns containing putrefying organic matter, such cities, — whether situated in the swamps, like New Orleans, or on dry hills, like Memphis, — may expect an annual visitation of yellow fever, cholera, and other zymotic diseases. Dr. Williams, of London, wrote as follows: “The soil that drains from habitations contains, in addition to excrement, dirty water, the washings and remnants of animal and vegetable matters used as food, and other offal; all these are mixed together, and stagnate in the corrupting slough that is retained in cess-pools and privies, or that is carried into sewers. The worst nuisance of this description is the cess-pool without a drain from it, unemptied for months or years, and often imperfectly covered. It continually poisons both air and *water*, and typhoid fever, diarrhœa, cholera, dysentery, dyspepsia, inappetency, general weakness, and mal-nutrition, are the results of their pestiferous operations, acting in different degrees. *Impure water*, used as a drink, is a common cause of disease. River or pump water near towns often contains decaying vegetable or animal matters, and induces sickness, diarrhœa, dysentery, and typhoid symptoms.” At Rugby, Tenn., during the past summer, twenty-three cases of typhoid fever occurred. Seven of these cases died. Visitors and citizens to the number of fifty there contracted lingering diarrhœa. The population of Rugby is two hundred. The town is situated on an elevated plateau four thousand feet above the level of the sea. The ground is of sandstone formation. A hotel was opened there in 1880. The water supply of nearly the whole town was obtained from a well and cistern in the rear of the hotel. Dr. Whittaker, of Cincinnati, visited the place to afford relief and discover if possible the source of the infection. It was his opinion that human excrement found its way into the cistern and infected the drinking water, not only of the cistern, but of the well, which, removed from the cistern but a few feet, might easily receive its poison by percolation through its walls. “Decomposing animal and vegetable matter was found in the cistern in such quantity as to sicken the workmen engaged in cleaning it.” Chemical analysis of the well water revealed the presence in it of a large amount of organic matter. Cholera visited London in 1849 and 1854. Certain parts of the city were supplied with the Thames water, and it was subsequently ascertained that this water produced the cholera. In 1849 two companies — the Southwark Company and the Lambeth Company — supplied all the districts with water when cholera appeared. These companies drew water entirely below Battersea Bridge, which is within the tidal influence, and within the influence of pollution from sewers. The disease developed in its worst forms in all the districts whose water supplies were furnished by these companies. In 1854 the



Lambeth Company drew its water supply from the Thames above Teddington, and above the sewage pollution of the river. Then the district supplied by the Southwark Company had a very high mortality from the cholera, while the district supplied by the Lambeth Company had a very low mortality from the same disease. There are those who think that running water will oxidize all the harm out of sewage and the dejections of fever patients, and, as many towns in the United States are supplied with water from rivers to which sewage has access, it is important to know what dangers are to be feared by drinking polluted water from rivers. From 1840 to 1870 there were 54,522 deaths in the United States from typhoid fever alone, and in England upward of 73,000 persons died of enteric fever from 1871 to 1880. During the ten years terminating June 1, 1850, 31,506 persons perished from cholera and 20,556 from dysentery. The next decade furnished 26,402 deaths from scarlet fever. It will be seen that the opportunities of investigation have been numerous, and it would be surprising indeed if all the researches of sanitarians have proved little or nothing regarding the development of zymotic diseases. The Rivers Pollutions Commissioners held that, although oxidation did take place in rivers, there was no river in England long enough to effect the destruction of sewage by this means. Dr. Frankland was of the opinion that sewage in running water can be oxidized, if that is possible, in a run of "not less than two hundred miles," and in any moderate flow of fifteen or twenty miles the oxidation is very slight indeed. Perhaps a better illustration of the harmful effects of sewage in river water used for domestic purposes could not be given than the following: "The Don flows from Sheffield and Rotherham to Doncaster. In 1866, according to Dr. Siemen's report, there was cholera from July to October in Sheffield. The epidemic commenced in July, was very bad in August and September, and ceased about the 10th of November at Doncaster, which was about a fortnight after it had ceased at Sheffield. I think that is a very clear illustration of the effect of the cholera on infected sewage carried down a distance of between fifteen and twenty miles from one town to another and carrying the disease with it." Dr. Frankland says: "I know the case very well myself. The outbreak of cholera occurred a little earlier in Sheffield than it did in Doncaster; the people of Doncaster drank the sewage of the people of Sheffield, and they got the cholera."

Reichardt conducted a great number of analyses of river water, and by the results of his investigations it is shown to be unsuitable for culinary or drinking purposes, as the rainfall changes the quality of the water so often. Freshets carry into river water all manner of decaying vegetable and animal matter in solution. Manures from cultivated lands and materials of waste from manufacturing establishments are washed into rivers, and by disintegration pollute the water. In 1868 the Rivers Pollutions Commissioners of England, made their sixth report, in which they gave the result of their examinations of potable waters in general, and the water supply of London in particular, and formulated a series of conclusions, some of which are here given. We should condemn, —

(a.) Any liquid which has not been subjected to perfect rest in subsid-

ence ponds of sufficient size for a period of at least six hours, or which, having been so subjected to subsidence, contains in suspension more than one part by weight of dry organic matter in 100,000 parts by weight of the liquid, or which, not having been so subjected to subsidence, contains in suspension more than three parts by weight of dry mineral matter, or one part by weight of dry organic matter in 100,000 parts by weight of the liquid.

(b.) Any liquid which shall exhibit by daylight a distinct color when a stratum of it one inch thick is placed in a white porcelain or earthenware dish.

(c.) Any liquid which contains more than one part chlorine in 100,000 parts.

Virchow, Vogt, Radcliffe, and Stewart, have advanced the doctrine, that polluted drinking water is often the most important, if not the principal, cause of typhoid fever. Buhl believes that *this disease increases with subsidence or fall in the ground water*, as at that time organic matter, chlorine, ammonia, etc., become concentrated in the low water of rivers and in wells from which water supplies are obtained. Pettenkofer states that "The greatest recession of ground water coincides with the most violent types of typhoid fever." Many wells are excavated in beds of sand and gravel alone, and do not reach clay or rock. They drain all the adjoining higher ground, and, of course, receive the filth of all soluble matters upon or in the soil for considerable distances.

There are very few cities in the United States where zymotic diseases are more prevalent than at Indianapolis, a city of 75,500 inhabitants. From January 1 to November 1, 1881, there occurred in that city the following deaths :—

From dysentery and diarrhœa . . . . .	67
From typhoid fever . . . . .	52
From malarial, congestive, remittent, intermittent, and bilious fevers . . . . .	47
From cholera infantum, inanition, and infantile marasmus . . . . .	149
From diphtheria . . . . .	21
From scarlet fever . . . . .	13
From measles . . . . .	6
<hr/>	
Total . . . . .	355

At Indianapolis the earth is built up of alternate beds of sand, gravel, and clay. The sand and gravel extend thirty or forty feet below the surface before clay is found, and it is from this stratum of sand and gravel that the water supplies of all dug wells in the city are derived. This first stratum of water is contaminated very largely by sewage, and so long as two thirds of the inhabitants constantly drink this sewage-polluted water, and the city government does not condemn and fill in all the dug wells within a radius of one mile of the centre of the city, Indianapolis will soon be one of the most unhealthy cities on the continent. Numerous wells in that city fluctuate as the water rises and falls in adjacent cellars, sewers, cess-pools, and privy vaults. During the last two years I have made a very thorough sanitary survey of Indianapolis. I employed an analytical chem-

ist, Mr. John Hurty, to make over one hundred and fifty analyses of different samples of well water. One year ago I gave to the public an extended report of the well waters of this city, and cited many cases of sickness brought on by impurities of well water. I now give thirty-one analyses made from these waters in the last six months:—

*First sample.*—Was obtained from a well where one case of typhoid fever was developed, and no other cause of the fever than the water could be given by the physicians. Well polluted by soakage from the privy.

*Second sample.*—Was taken from a well where two cases of typhoid fever were rapidly progressing, but were arrested by stopping the use of the water and administering remedies. Pollution of the water by sewage.

*Third sample.*—Came from a well which was undoubtedly the cause of three cases of typhoid fever, one of which proved fatal. One case of persistent diarrhœa. Well polluted by excremental matter.

*Fourth sample.*—An infant died of cholera infantum where this water came from, and five adults had continued diarrhœa. I am quite sure that the water caused the trouble in the family. Inefficient nuisance removal, no sewerage, low ground, and soil pollution.

*Fifth sample.*—One case of typhoid fever. No other cause of the fever than the water could be found. Bad drainage, and water of well derived largely from polluted ground.

*Sixth sample.*—One case of typhoid fever, and the water probably the cause of it. No sewerage, shallow well in low ground, and polluted by soakage from the privy.

*Seventh sample.*—Five cases of typhoid fever among those who had used the water. No drainage or sewerage, soil saturated with filth, inefficient dealing with nuisances, illy-constructed and filthy houses.

*Eighth sample.*—One case of typhoid fever. Badly constructed and improperly placed privies, some houses unfit for habitation, neglected yards, inefficient excrement and refuse disposal, overcrowded cottages, low ground, no sewerage, and polluted water.

*Ninth, tenth, eleventh, and twelfth sample.*—Came from Irvington, a suburb of Indianapolis, and four miles east of the city. The earth is made up for a considerable distance down of clay, and the wells are not over thirty feet deep on an average, and hold surface water. A great many of the wells are situated under porches, and near the kitchens. During the summer and autumn of this year the water was low in the wells from the subsidence of the ground water, and the wells have not been kept free from contaminating influences. Over twenty-five persons in a population of six hundred who reside in Irvington and that vicinity have had since the drought this year, typhoid fever, typho-malarial fever, and fever with typhoid symptoms. After making a thorough investigation of the town, I am convinced that the fever was brought on by impure water. If necessary, I can give similar descriptions of the remainder of the samples, except those marked good.

According to the latest and best authorities, typhoid fever can be produced by filth and bad water.



Since the year 1849, when Dr. Jenner made known his conclusive and masterly discrimination of typhoid fever, successive studies have tended to connect it in its origin with excremental matter. Dr. John Simon says: "Of all the diseases which are attributable to filth, enteric fever, as an administrative scandal, may be proclaimed as the very type and quintessence; that in the most glaring way it apparently has an invariable source in that which of filth is the filthiest; and that its infection runs its course by instrumentality of the molecules of excrement which man's filthiness lets mingle in his air and food and drink."

Summer or autumn diarrhœa is doubtless at times produced by direct mechanical irritation, and at others by the absorption into the blood of septic matters from foul ingesta, mainly drinking water. Wherever suspicion rests upon drinking water let the water be analyzed, and if it is found to contain elements which will produce disease, it should not be used without being purified. Fox states that "a good water for drinking purposes should not contain more than —

	Milligrams per liter.
Free ammonia . . . . .	.01 or .02
Albuminoid ammonia . . . . .	.08 or —

And that a water with or even without an excess of free ammonia which displays a larger amount of albuminoid ammonia than .15 milligrams per liter should always be condemned if there is an excess of nitrogen, as nitrates and nitrites (in non-chalky districts) and an excess over the average of the district of chlorides."

The Vienna Water Commissioners reported in 1864 that healthy water could be obtained by observing the following rules:—

- (a.) Water must be clear, sparkling, and colorless.
- (b.) It must contain but a small quantity of solid materials, and be entirely free of organized matter (infusoria).
- (c.) Of the alkaline earths (CaOMgO) it must not contain more than eighteen parts by weight in 100,000 parts by weight of the water.
- (d.) It must contain but a small fractional part by weight of soluble salts, particularly the sulphates and nitrates.
- (e.) The solids held in solution and the temperature of the water must vary within very narrow limits during the year.
- (f.) It must be protected from contamination.
- (g.) The above requirements are fulfilled in many cases by soft spring water, which alone is suitable for drinking purposes.
- (h.) The industries require water having nearly the same properties.
- (i.) Filtered river water, if at all times free of turbidity, will answer for technical purposes, but, on account of not fulfilling requirements *e* and *f*, is not fit for drinking.
- (j.) To sprinkle or clean streets any water is suitable, providing it is odorless and does not contain a great amount of offensive materials.

DESCRIPTION.	PARTS IN 100,000.							APPEARANCE OF RESIDUE WHEN IGNITED.				OPINION.
	Total Solid Mat- ter.	Organic Matter and Vol- atile Matter.	Chlorine.	Free Ammonia.	Albuminoid Am- monia.	Nitrogen as N. trates and N. trites.	Sulphates.	Total Hardness. Clark.	Before Ignition.	During Ignition.	After Ignition.	
North New Jersey Street . . . . .	93	42.6	7.2	.005	.024	Abundant.	Abundant.	27.5 <sup>o</sup>	Dirty white.	Blackened; odors evolved.	Yellowish white.	Bad.
Ash Street . . . . .	62	18	3.6	.0072	.0148	Trace.	Trace.	16.8	Yellowish white.	Brown rings; faint odor.	Dirty white.	Bad.
North New Jersey Street, 331 . . .	101	24	6.5	.015	.0178	Abundant.	Abundant.	20.4	White.	Brown; faint odor.	Yellowish white.	Bad.
Fayette Street, 9 . . . . .	43	13.5	4.2	.0066	.0176	Abundant.	Abundant.	18	White.	Black and yellow spots.	Dirty white.	Bad.
North East Street, 230 . . . . .	92	12	5.4	.0154	.0136	Abundant.	Abundant.	16.9	White.	Yellowish.	White.	Bad.
Corner Cherry Street and Park Ave.	77	13.2	0	.008	.0162	Abundant.	Trace.	15.5	White, with yellow spots.	Yellowish; odor faint.	Dirty white.	Bad.
West Market, 82 . . . . .	76	13.5	5	.0116	.0238	Abundant.	Abundant.	16.5	White, with yellow blotches.	Yellowish brown; bad odor.	Dirty white.	Bad.
North Liberty Street, 32 . . . . .	117	37	8.5	.0132	.0268	Abundant.	Abundant.	28.5	Yellowish white.	Blackened; bad odor.	Dirty white.	Bad.
Irvington . . . . .	86.4	19.4	20	.017	.028	Gr't abun.	Abundant.	60	White.	Brown rings and spots; bad odor.	Yellowish white.	Very bad.
Irvington . . . . .	60	25	8	.007	.0132	Abundant.	None.	36	White.	Yellow rings and patches.	Yellowish white.	Bad.
Irvington . . . . .	69	17	2.2	.0058	.0246	Trace.	Trace.	50.4	White.	Brown rings; faint odor.	Dirty white.	Bad.
Irvington . . . . .	75	21.4	15	.0136	.0246	Abundant.	Abundant.	47.5	White.	Yellow; odor.	Dirty white.	Bad.
North Pennsylvania Street . . . .	132.6	51	14	.0048	.022	Trace.	Abundant.	31	White.	Brown rings; bad odor.	Yellowish white.	Bad.
North New Jersey Street . . . .	105	29.5	7.2	.06	.028	Trace.	Abundant.	31.5	Yellowish white.	Blackened; bad odor.	Yellowish white.	Bad.
Christian Avenue, 47 . . . . .	95	22	4.2	.004	.016	Trace.	Abundant.	28½	White.	Brown; faint odor.	White.	Bad.
North Tennessee Street, 384 . . .	78	29	10	.008	.022	Trace.	Abundant.	26.5	White.	Blackened; faint odor.	Dirty white.	Bad.
North Mississippi St., cor. Second	87	32.4	10	.0048	.028	Trace.	Abundant.	27	White.	Brown rings; faint odor.	White.	Bad.
North Delaware Street . . . . .	136	46	7	.006	.016	Abundant.	Abundant.	32	Yellowish white.	Brown rings; faint odor.	Dirty white.	Bad.
North East Street . . . . .	85	33.5	8.2	.018	.020	Abundant.	Abundant.	27	White.	Brown; bad odor.	Dirty white.	Bad.
Blind Asylum . . . . .	59.4	0.94	3	Trace.	.008	Trace.	Trace.	12.3	White.	Yellowish white.	White.	Good.
River, opposite Water Works . . .	28	6.3	8	.0068	.029	Trace.	None.	12	White, with brown spots.	Blackened; bad odor.	Yellowish white.	Bad.
Wellon Bar, opposite Water Works	32.4	3.4	8	.010	.012	Trace.	None.	18	Cream color.	Brown rings; odor bad.	Cream color.	Bad.
Kentucky Avenue . . . . .	67	11	2.4	.0025	.0095	Trace.	Trace.	21	White.	Yellowish white.	White.	Good.
Michigan Street . . . . .	45.6	17.6	10	.002	.0152	Abundant.	Trace.	17.8	Yellowish white.	Blackened; bad odor.	Dirty white.	Bad.
Driven well in country . . . . .	34	6	4	Trace.	.008	Trace.	Trace.	14.2	White.	White.	White.	Good.
Brightwood Well . . . . .	48	10	1	.0076	.016	Trace.	Trace.	35.6	White.	Brown rings; faint odor.	White.	Suspicious.
School Street . . . . .	84	12	7.6	.002	.0132	Abundant.	Abundant.	26	White.	Dirty yellow, then brown.	Yellowish white.	Bad.
Post Office, driven well . . . . .	38	82	1.2	.001	.0052	Trace.	Trace.	17	White.]	Green and yellow; no odor.	White.	Good.
North Illinois Street . . . . .	26	6	1.6	.001	.001	Trace.	Trace.	15	White.	Rings; no bad odor.	White.	Suspicious.
North Pennsylvania Street . . . .	91	13	7.5	.0018	.0098	Abundant.	Abundant.	33.2	White.	Cream color.	White.	Suspicious.
North Alabama Street . . . . .	91	20	8.2	.0428	.0312	Abundant.	Abundant.	22.5	White.	Brown rings; faint odor.	Dirty white.	Bad.

## XXX.

### SCARLET FEVER AS IT AFFECTED THE WHITE AND COLORED RACE, COMPARATIVELY, IN CHARLESTON, S. C., DURING THE SPRING AND SUMMER OF 1881.

By H. B. HORLBECK, M. D.,

*City Registrar and Secretary of Board of Health, Charleston, S. C.*

Population, white, 22,713 ; black and colored, 27,286. Census of 1880.

First case white, January 17.

First case black and colored, March 12.

First death, white, March 1.

First death, black and colored, March 29.

Last death, white, August 1.

Last death, black and colored, August 26.

Total deaths, white, 82, — 44 male, 38 female.

Total deaths, black and colored, 35, — 17 male, 18 female.

Total deaths, March, white, 17 ; black and colored, 2.

Total deaths, April, white, 35 ; black and colored, 11.

Total deaths, May, white, 17 ; black and colored, 13.

Total deaths, June, white, 7 ; black and colored, 5.

Total deaths, July, white, 5 ; black and colored, 2.

Total deaths, August, white, 1 ; black and colored, 2.

Totals	. . .	. . .	. . .	82	35
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Average age of white cases which were fatal, 6 years 5 months.

Average age of black and colored cases which were fatal, 7 years 6 months.

Average duration of white cases which were fatal, 9 days.

Average duration of black and colored cases which were fatal, 7 days 6 hours.

Greatest age of a white case which was fatal, 34 years.

Greatest age of a black case which was fatal, 24 years.

Least age of a white case which was fatal, 1 year.

Least age of a black case which was fatal, 2 months 23 days.

Received of 32 physicians number of cases treated, 924. White patients, 681 ; black and colored patients, 243 = 924.

Ratio white per 1,000 fatal, .00361 ; population, 22,713.

Ratio black and colored per 1,000 fatal, .00124 ; population, 27,286.

Percentage white fatal, 12.04 ; population, 22,713.

Percentage black and colored fatal, 14.40 ; population, 27,286.

The above statistical report has been prepared from the records of the Department of Health of Charleston, with a view of indicating the comparative liability of the white and colored race to scarlet fever.

The population of Charleston being somewhat equal in number, affords the opportunity, the epidemic being rather general.

It will be seen that the colored race is less liable, from the above statis-



tics, in the proportion of about three white cases to one colored, the percentage of fatality being about even, the slight difference being perhaps due to the poverty and want of attention among the colored race.

Otherwise, as to average age attacked, duration, etc., there is a great similarity. The epidemic presented no remarkable symptomatic type worthy of notice.

## XXXI.

### THE SUNSTROKE EPIDEMIC OF CINCINNATI, O., DURING THE SUMMER OF 1881.

By ABIJAH J. MILES, M. D.,  
*Health Commissioner.*

THE mortality in the city of Cincinnati, during the summer of 1881, was so much in excess of that of any previous summer since the organization of the Board of Health in 1866, that it became important to make due inquiry as to the cause.

The total mortality for the past ten years for the months of July and August was as follows: July, 5,239, an average of 523.9 per month; August, 4,514, an average of 451.4 per month. The percentage per 1,000 per annum for July, was 97.59, that for August, 84.18. For both July and August, 181.77.

The total mortality for these months of 1881 was for July 923, August 584; the percentage per 1,000 inhabitants per annum was, for July, 172.25, and for August, 108.74. For both July and August, 280.99. This number being 99.22 in excess of the average mortality per 1,000 inhabitants per annum during the previous ten years.

The greatest death-rate from any one cause during this time was from sunstroke. By reference to the following tables it will be observed, that the death-rate on each day, exclusive of those charged to sunstroke, is very large.

This is due, no doubt, to the excessive heat, as only those deaths attributed directly to sunstroke are so charged in the tables, while many other deaths occurred from diseases which might not have proven fatal had it not been for the extreme hot weather. Among those were many infantile deaths credited to cholera infantum, diarrhœa, convulsions, and also from old age, exhaustion, etc., etc.

The first death from sunstroke during the past summer occurred May 14. The last death on September 8. The severest of the epidemic commenced July 7, and continued until July 15. The largest number of deaths from sunstroke on any one day was fifty-four, which occurred July 12. The total number of deaths from all causes on that day was ninety-four. Maximum range of thermometer, 102.5° F., minimum, 82.2° F., mean, 91.4° F. Relative humidity, 45.8. Weather clear.

*Table of Deaths from Sunstrokes during the Summer of 1881, together with the Meteorological Observations and Total Death Rate.*

Date, 1881.	Number of Deaths from Sunstroke.	Thermometer.			Barometer. Daily Mean.	Relative Humidity. Daily Mean.	Rain-fall. Inches.	Total Deaths from all Causes.	State of Weather.
		Maximum.	Minimum.	Daily Mean.					
May 14 . . . . .	1	87.0	64.5	74.2	29.876	69.0	1.21	27	Cloudy.
May 26 . . . . .	1	87.0	64.0	77.0	30.089	43.7	.00	15	Clear.
May 31 . . . . .	1	86.0	71.0	76.2	29.806	60.3	.03	16	Fair.
June 29 . . . . .	1	94.0	76.5	84.6	29.867	73.3	1.00	28	Fair.
July 1 . . . . .	0	82.0	65.0	72.3	30.105	54.0	.00	14	Fair.
July 2 . . . . .	0	85.0	65.5	74.3	30.210	55.3	.00	12	Clear.
July 3 . . . . .	1	92.0	67.0	79.0	30.185	51.7	.00	20	Clear.
July 4 . . . . .	1	94.0	73.0	82.2	30.095	51.3	.00	21	Fair.
July 5 . . . . .	1	93.0	75.0	83.7	30.061	56.3	.00	18	Clear.
July 6 . . . . .	0	97.0	78.0	88.0	30.047	58.0	.00	22	Fair.
July 7 . . . . .	16	98.0	82.0	88.9	30.003	57.5	.00	62	Fair.
July 8 . . . . .	18	99.5	81.0	89.4	30.019	53.7	.00	54	Clear.
July 9 . . . . .	21	100.5	79.5	89.9	30.060	53.7	.00	59	Fair.
July 10 . . . . .	30	103.5	80.5	91.1	30.058	50.5	.00	67	Clear.
July 11 . . . . .	39	102.5	82.0	91.7	30.021	47.7	.00	69	Clear.
July 12 . . . . .	54	102.5	82.2	91.4	29.966	45.8	.00	94	Clear.
July 13 . . . . .	42	99.2	82.3	89.3	29.990	53.3	.00	76	Fair.
July 14 . . . . .	13	94.3	75.0	83.8	30.040	67.3	1.54	44	Fair. <sup>1</sup>
July 15 . . . . .	11	90.2	74.3	82.4	30.097	67.3	.20	28	Fair.
July 16 . . . . .	5	95.0	76.5	86.3	30.025	66.3	—	22	Cloudy.
July 17 . . . . .	5	87.0	69.5	76.8	29.944	68.3	.29	24	Fair.
July 18 . . . . .	1	85.0	68.5	75.8	29.943	53.3	.00	8	Clear.
July 19 . . . . .	5	87.5	67.2	75.0	29.919	55.2	.00	19	Clear.
July 20 . . . . .	0	90.0	68.0	80.6	29.878	51.3	.00	21	Fair.
July 21 . . . . .	1	87.0	72.8	76.2	29.849	87.7	.93	10	Cloudy.
July 22 . . . . .	3	86.0	71.0	77.0	29.792	73.7	.01	16	Cloudy.
July 23 . . . . .	1	86.0	68.4	76.4	29.955	61.7	.00	22	Clear.
July 24 . . . . .	0	90.0	69.0	77.8	29.949	59.2	.00	20	Clear.
July 25 . . . . .	0	89.6	72.4	79.7	29.924	52.3	.00	12	Fair.
July 26 . . . . .	0	81.0	69.0	74.0	29.995	56.3	.00	14	Fair.
July 27 . . . . .	0	81.0	63.5	72.7	30.023	56.7	.00	18	Clear.
July 28 . . . . .	0	82.0	64.0	73.3	30.036	55.3	.00	9	Clear.
July 29 . . . . .	0	83.0	66.0	73.1	30.080	68.0	.15	18	Clear.
July 30 . . . . .	0	84.0	66.8	75.3	30.141	64.3	.00	19	Clear.
July 31 . . . . .	0	89.0	67.8	77.8	30.150	60.3	.00	13	Clear.
August 1 . . . . .	0	90.5	70.8	80.3	30.101	57.7	.00	22	Clear.
August 2 . . . . .	2	91.5	71.7	82.3	30.090	57.7	.00	30	Fair.
August 3 . . . . .	0	95.0	74.0	84.0	30.100	57.0	.00	18	Fair.
August 4 . . . . .	2	98.0	73.8	84.5	30.084	50.0	.00	19	Fair.
August 5 . . . . .	2	98.0	78.0	86.7	30.035	51.3	.00	22	Clear.
August 6 . . . . .	2	93.0	75.0	78.7	29.984	73.3	.13	25	Fair.
August 7 . . . . .	0	82.0	72.3	75.9	29.998	70.7	.05	13	Fair.
August 8 . . . . .	0	84.3	64.5	73.8	30.053	59.3	.00	13	Clear.
August 9 . . . . .	2	97.2	70.0	85.4	29.900	50.3	.00	30	Clear.
August 10 . . . . .	0	94.0	77.0	83.8	29.895	51.0	.00	25	Clear.
August 11 . . . . .	0	90.3	71.8	80.5	29.966	44.7	.00	13	Clear.
August 12 . . . . .	0	101.0	72.7	87.1	29.880	47.0	.00	21	Fair.
August 13 . . . . .	1	93.0	75.0	83.0	29.884	57.7	.07	21	Cloudy.
August 14 . . . . .	1	81.5	65.0	72.3	30.017	56.7	.00	19	Fair.
August 15 . . . . .	0	83.5	62.3	71.7	30.111	45.3	.00	17	Clear.
August 16 . . . . .	0	85.3	63.0	74.5	30.097	46.3	.00	13	Clear.
August 17 . . . . .	0	87.5	68.0	78.2	30.019	62.3	.00	19	Fair.
August 18 . . . . .	0	82.0	68.3	72.3	29.954	66.3	.01	14	Cloudy.
August 19 . . . . .	0	81.0	66.9	75.0	29.956	52.3	.11	11	Cloudy.
August 20 . . . . .	0	85.0	70.5	77.6	29.917	64.0	.00	11	Fair.



*Table of Deaths from Sunstrokes during the Summer of 1881, together with the Meteorological Observations and Total Death Rate — Continued.*

Date, 1881.	Number of Deaths from Sunstrokes.	Thermometer.			Barometer. Daily Mean.	Relative Humidity. Daily Mean.	Rain-fall. Inches.	Total Deaths from all Causes.	State of Weather.
		Maximum.	Minimum.	Daily Mean.					
August 21 . . .	0	82.3	70.3	75.8	29.932	66.0	.00	17	Cloudy.
August 22 . . .	0	82.0	67.0	74.3	30.055	54.0	.00	25	Clear.
August 23 . . .	0	84.5	65.5	74.5	30.148	45.3	.00	11	Clear.
August 24 . . .	0	88.5	65.5	76.3	30.104	44.7	.00	18	Clear.
August 25 . . .	0	91.5	66.8	78.3	30.169	46.7	.00	14	Clear.
August 26 . . .	0	91.5	68.0	79.5	30.120	53.0	.00	27	Clear.
August 27 . . .	0	92.0	69.4	80.2	30.095	55.0	.00	24	Clear.
August 28 . . .	0	95.0	71.5	83.3	30.046	47.7	.00	17	Clear.
August 29 . . .	0	96.0	77.0	87.0	30.062	53.3	.00	17	Clear.
August 30 . . .	1	94.5	80.0	86.8	30.170	59.3	.10	24	Fair.
August 31 . . .	0	91.0	72.0	81.8	30.117	64.7	.29	14	Fair.
September 1 . . .	0	87.0	71.0	79.4	30.063	65.3	—	16	Fair.
September 2 . . .	0	87.0	73.0	79.7	30.009	64.3	.00	21	Cloudy.
September 3 . . .	0	89.0	71.5	80.2	29.986	65.3	.00	17	Fair.
September 4 . . .	0	87.0	74.5	80.3	29.990	68.0	.54	14	Fair.
September 5 . . .	0	95.0	74.5	84.8	30.083	58.3	.00	17	Clear.
September 6 . . .	2	95.0	76.8	86.3	30.155	59.0	.00	16	Clear.
September 7 . . .	0	93.0	76.5	84.7	30.154	60.3	.00	29	Clear.
September 8 . . .	1	93.0	75.0	83.2	30.123	61.3	.00	16	Cloudy.
September 9 . . .	0	91.5	75.0	82.8	30.050	59.3	.00	18	Fair.
September 10 . . .	0	93.0	73.0	80.5	29.964	61.3	.00	19	Fair.
September 11 . . .	0	75.0	60.0	66.3	30.145	44.3	.00	16	Fair.
September 12 . . .	0	80.0	58.0	68.0	30.143	51.0	.00	13	Clear.
September 13 . . .	0	80.0	60.7	70.7	30.139	45.3	.00	17	Clear.
September 14 . . .	0	78.0	60.5	68.9	30.020	64.0	.15	19	Cloudy.
September 15 . . .	0	73.0	64.8	69.1	29.704	86.0	.94	20	Cloudy.
Total . . . .	288	—	—	—	—	—	—	1,863	

27.40 per cent. of total deaths were from sunstroke.

72.60 per cent. of total deaths were from other causes.

The fatal cases of this disease are classified as follows :—

Whites . . . . .	279
Colored . . . . .	9
Total . . . . .	288

#### NATIVITIES.

Born in Cincinnati . . . . .	49
Born in other parts of the United States . . . . .	46
Total United States . . . . .	95
Born in Germany . . . . .	131
Born in Ireland . . . . .	53
Born in England . . . . .	2
Born in other foreign countries . . . . .	4
Birth-place not known . . . . .	3
Total . . . . .	288

In consequence of the prevailing impressions that a hot and humid atmosphere predisposes to sunstroke, we have taken great pains to analyze the meteorological observations, which are herewith submitted. These observations were taken by the United States Signal Corps, and are therefore reliable. The object in thus presenting these tables is to prove by the observations, that the *drier the atmosphere* the greater will be the increase in the death-rate from insolation.

During the epidemic of 1881, there were two hundred and eighty-eight deaths returned as due directly to sunstroke.

The following meteorological observations have been carefully compiled and studied, and will prove very interesting in their bearing upon this cause of death.

1st. When the maximum reading of the thermometer was from 100 to 105° F., there were 151 deaths, occurring in four days, an average of 37.75 per day. The mean reading being 88.5° F., and the weather clear. The humidity of the atmosphere (obtained by means of wet and dry bulb thermometer), 49.6, this being  $\frac{4}{10}$  of 1° below one half saturation (complete saturation being 100).

2d. Maximum reading of thermometer in three days, ranging from 87 to 102.5° F. Mean thermometer, 85.7° F. Humidity, between 40 and 50. Number of deaths, 89. Average per day, 29 $\frac{2}{3}$ .

3d. Maximum reading of thermometer in eighteen days, ranging from 82 to 103.5° F. Mean thermometer, 84.6 (average). Humidity, between 50 and 60. Number of deaths, 174. Average per day, 9.66 $\frac{2}{3}$ .

4th. Maximum reading of thermometer in eight days, ranging from 86 to 95° F. Mean thermometer, 79.9 (average). Humidity, between 60 and 70. Number of deaths, 22. Average per day, 2.625.

5th. Maximum reading of thermometer in three days, ranging from 86 to 94° F. Mean thermometer, 91. Humidity, between 70 and 80. Number of deaths, 3. Average per day, 1.

6th. Maximum reading of thermometer in one day, 87° F. Mean thermometer, 76.2. Humidity, between 80 and 90. Number of deaths, 1. Average per day, 1.

It is an interesting fact to note that out of 288 deaths which occurred, 263, or 91.32 per cent. of the whole number of deaths occurred on days when the humidity (moisture) of the atmosphere was below 60, and 129, or only 44.79 per cent., occurred on cloudy or partly cloudy days.

The following tables have been classified, so as to enable us to better understand the meteorological conditions that were at this time present:—

Humidity (saturation being 100).	Number of Days.	Number of Deaths.	Rate per Day.
Between 40 and 50 . . . . .	3	89	29 $\frac{2}{3}$
Between 50 and 60 . . . . .	18	174	9.66 $\frac{2}{3}$
Between 60 and 70 . . . . .	8	21	2.625
Between 70 and 80 . . . . .	3	3	1.
Between 80 and 90 . . . . .	1	1	1.

Weather.	Number of Days.	Number of Deaths.	Rate per Day.
Clear <sup>1</sup> . . . . .	14	159	11.81
Fair <sup>2</sup> . . . . .	16	125	7.8
Cloudy <sup>3</sup> . . . . .	3	4	1.33 $\frac{1}{3}$

The foregoing observations, which have just been presented, establish this fact: that as far as Cincinnati is concerned, the thermometer being the same, a dry atmosphere is much more conducive to sunstroke than a hot and moist atmosphere. This fact is contrary to the opinion of many authors, as will be seen in the following quotation from "Reynolds' System of Medicine," volume two, page 135, second edition:—

"There is no agreement among observers as to the effect of extreme dryness or moisture in increasing or diminishing the effect of heat. Insolation has been observed in both conditions. In the case of the Forty-third Regiment (English light infantry), the hot, dry, land winds were blowing. Mr. Longmore also notes the extreme dryness of the air at Barrackpore during the outbreak there, and in all the examples given, the disease disappeared with the first heavy fall of rain, attended with a rapid fall in temperature. On the other hand, Dr. Baxter, of the Ninety-third Highlanders, who gives four cases of sunstroke observed at Sealkote, considers that sunstroke is much more likely to occur when the atmosphere 'is largely impregnated with watery vapor.'"<sup>4</sup>

Mr. Naylor is of the opinion that cloudy days, with a moist condition of the atmosphere, favor the occurrence of insolation.<sup>5</sup> Exact observations on this point, with the wet and dry bulb, are much required.

"It would appear that a hot and moist condition of the air is most favorable to the production of insolation in barracks, because not only does such a condition diminish the cooling effects of evaporation from the skin, but interferes with the artificial means used to reduce the temperature of the overheated rooms."

No doubt this was the opinion arrived at by many eminent writers without being proven by actual meteorological observations. This opinion is not only questioned, but disapproved by the foregoing observations. For we find upon thorough investigation, that when the amount of moisture in the atmosphere was above 60, only 25 deaths occurred; while on the other hand, when the humidity was below 60, 263 deaths took place,—this being over ten times the number that died while the atmosphere was moist.

The number of sunstrokes and prostration from heat in our city was truly alarming. Many persons who suffered from this prostration during the extreme weather were not exposed to the direct rays of the sun, but succumbed

<sup>1</sup> Clear, means sky unclouded.

<sup>2</sup> Fair, means sky half or more clouded.

<sup>3</sup> Cloudy, means sky overcast more than three quarters.

<sup>4</sup> *Dublin Quarterly Journal of Medical Sciences*, No. 81, February, 1866.

<sup>5</sup> Morehead's *Clinical Researches*.



in some of the many factories or shops. Many others were taken while employed at their daily avocations, and others while on their way to and from their places of business. Many of those who were overcome by the heat became unconscious at once, while others were simply prostrated; and again many more were taken at their homes, and were not considered sunstruck. Many of those persons who became unconscious on the streets were taken at once to the City Hospital, which is located near the centre of the city.

We found that where patients in this condition were removed any great distance, the danger of the disease was greatly increased. To obviate this difficulty, temporary hospitals were established in each ward of the city, to facilitate the officers in summoning medical aid, and to protect the patient from the direct rays of the sun, and avoid the heated atmosphere which must necessarily be encountered in close-covered hacks or ambulances, by transporting them a long distance to the General Hospital.

Directions were also given as to the treatment to be resorted to in the absence of the medical attendants. The patient was to be placed in a cool place, ice to be applied to the head, and the whole body sponged with water, and ammonia and whiskey administered internally. After these measures had been taken, the number of fatal cases perceptibly decreased. The total number of cases of insolation that occurred was estimated to be over 2,000.

The number of cases treated by the physicians to the out-door poor was 308, of which 265 recovered and forty-three died, or 16 per cent., or one in seven.

The number of cases treated at the City Hospital was 130. Of these 107 recovered and 23 died, this number being 17.69 per cent. deaths, or one in six.

The greater mortality at the hospital may be accounted for by the fact that many were brought there in a dying condition, and some died on the way to the hospital.

I am indebted to Dr. Walter A. Dunn, *interne* to the Cincinnati Hospital, for the following facts in reference to the symptoms and treatment of cases that occurred in that institution:—

Table showing the Number of Cases admitted into the Cincinnati Hospital, together with Result of Treatment, Condition, Color, etc.

Number of Cases.	Number Recovered.	Number Died.	Number Unconscious.	Number Temperature Range above 105°.	Number Temperature Range above 107°.	Colored.	White.	Post Mortems.	Number Pulse above 120.	Opisthotonos Convulsions.	Number Dilated Pupils.	Number Contracted Pupils.
130 <sup>1</sup>	107	23	35	16	9	4	126	0 <sup>2</sup>	42	3 <sup>3</sup>	31	14

Table of Twenty-seven Cases treated at the Cincinnati Hospital, giving the Condition on Admission, and Results.

Temperature.	Unconscious.	Dilated Pupils.	Contracted Pupils.	Weak and very Rapid Pulse.	Stertorous Breathing.	Number of Post-Mortems.	Number of Cases Treated.	Treated before Arrival at Hospital.	Colored.	White.	Respirations.	Pulse.	Remarks.
101.0	-	+	-	-	-	-	+	-	-	+	30	90	Recovered.
107	+	+	-	-	-	-	-	-	-	-	132	132	Died in 5 minutes.
103	-	-	-	-	-	-	+	+	-	+	86	86	Recovered.
99	-	+	-	+	-	-	+	+	+	+	19	100	Recovered.
100	-	+	-	+	-	-	+	+	+	+	12	108	Recovered.
100	-	+	-	+	-	-	+	+	+	+	36	90	Recovered.
99	-	+	-	+	-	-	+	+	+	+	40	104	Recovered.
100	-	+	-	+	-	-	+	+	+	+	120	120	Recovered.
101	-	+	-	+	-	-	+	+	+	+	138	138	Recovered.
104	+	+	-	+	-	-	+	-	-	+	120	120	Recovered.
100	-	+	-	+	-	-	+	-	-	+	32	108	Recovered.
107	+	+	-	-	+	-	+	-	-	+	184	184	Recovered.
98	-	+	-	-	-	-	+	+	-	+	20	84	Recovered.
101	-	+	-	+	+	-	+	-	-	+	32	152	Recovered.
102	-	+	-	+	-	-	+	-	-	+	120	120	Died in 3 hours.
104	+	-	-	-	-	-	+	-	-	+	120	120	
101.2	+	-	+	+	+	-	+	-	-	+	175	175	Opisthotonos; died 25 days after.
101.4	-	+	-	-	-	-	+	-	-	+	108	108	
103	+	+	-	+	-	-	+	-	-	+	120	120	
101	-	+	-	-	-	-	+	+	-	+	100	100	
103.4	-	+	-	+	-	-	+	-	-	+	132	132	
97.6	-	+	-	+	-	-	+	+	-	+	80	114	
98	+	+	-	-	-	-	+	+	-	+	120	120	
96.6	-	+	-	+	-	-	+	+	-	+	151	151	Died in 30 days of meningitis.
104	-	+	-	+	-	-	+	+	-	+	108	108	
100.4	-	+	-	+	-	-	+	-	-	+	28	108	
103	+	+	-	+	-	-	+	-	-	+	36	144	

The following is the clinical history of three typical cases, showing the difference in the symptoms and course of the disease:—

CASE No. I. Julia H. June 10, 1881, A. M. Age, 45; born in Ireland; single; occupation, laundress; drinker.

Previous history: She is very poorly developed and nourished. Blue eyes, light gray hair, contracted face and features, face covered with lines and

<sup>1</sup> In six cases insanity followed.

<sup>2</sup> Could not obtain consent of friends in time.

<sup>3</sup> Two recovered.

wrinkles. She is much debilitated by her bad habits and the discharge from an ulcer on the right leg.

Present condition: There is a large ulcer on the anterior and lateral surfaces of the right leg, about five inches above the ankle. The ulcer is about four inches in diameter, and is filled with poor, bluish granulations. This ulcer began about ten years ago, and has continued ever since, becoming better when she laid up and had it treated in the hospital. Twice during this period of ten years the ulcer almost healed, and she never stayed long enough to have it completely healed. Ordered flaxseed poultice.

*June 15.* The discharge is greater and consists of healthy pus. The granulations are becoming redder and more active, and are springing up from the floor of the ulcer.

*July 7.* The granulations looked very healthy. Skin-grafting was advised at this time; she refusing that treatment was discharged from the house.

Diagnosis: Ulcer of the leg. Condition improved.

*July 13.* She was admitted in the morning, very profoundly unconscious. Eyes were rolled up; pupils dilated; head thrown back; mouth widely opened.

Respirations were short, very slow and gasping, with apparently some obstruction about the larynx. Pulse 168, very weak and intermittent, — 1-15; could not be felt at all at the wrist. Temperature, 106. Involuntary evacuations of fæces had occurred some time before. She had a black eye on right side; no other bruises were noted.

Treatment (immediately), hypodermic. Digitaline, one sixtieth grain. This stopped the intermittent character of the pulse very soon, but did not lessen the frequency, nor appreciably increase the force of the pulse. She was placed in a bath of hydrant water, and had ice caps applied to her head and cold water poured on her head from a height while in the tub. She was given hypodermic injections, one sixtieth grain atropia, and again fifteen gtt. aqua ammonia and ten gtt. sulphuric ether, all without any effect, upon either the pulse or respiration. The temperature fell to 99, and she was removed and placed on a stretcher. Pulse, 168. Respiration gasping, though possibly a little deeper and more frequent. Inhalations of ether were then given, endeavoring only to get the stimulating effects. The respirations almost immediately became fuller, longer, more natural and easy. The pulse became stronger and slower. Inhalations stopped. A few minutes after she returned to her old condition, same as on entering, temperature alone remaining down. Inhalations were again tried with a result similar to before; consciousness did not return.

When respiration became quiet again, was sent from the accident ward to the medical ward.

The same symptom, that of very difficult respiration, again manifested itself in the ward, and was again relieved by ether. This symptom returned again and again, and was controlled each time in the same manner.

The temperature remained at the normal, but the heart began to fail, and would not respond to any of the agents employed hypodermically. Death resulted about eight hours after attack. No autopsy.



CASE No. 2. Mike B. Was admitted about midnight, July 12. He was brought from Hammond Street police station. Had been there some time before the ambulance could be got there.

His condition was so bad that the officers thought it was not worth while to take him to the hospital, as he would surely die on the way. On admission his pulse was 175, and very weak; temperature, 105; pupils contracted. He breathed with the greatest difficulty. Convulsions were coming on at intervals of a few minutes, and were marked by opisthotonos. Lividity of face, frothing at mouth, and tonic contraction of muscles, involving more especially the upper extremity, and especially dangerous as affecting the muscles of respiration.

The sphincter-ani muscles were relaxed, and involuntary evacuations of fæces had occurred. Was given hypodermic injections of digitaline, atropia, ether, and alcohol in rapid succession, without any material effect; his temperature increased and the pulse rose.

Cold was applied, and this seemed to induce the convulsions more frequently. The pulse became very rapid, could just be felt at femoral artery, and rose to 280 per minute.

Thinking the man's condition could not be made worse, sixty minims of aqua ammonia were given hypodermically. Immediate effect was noted; the heart responded, and in five minutes beat 140, with fair strength. Ether was next required, viz., to quiet the convulsions, and was repeated as often as the convulsions returned. About three A. M. he was sent to the ward, and the ether was continued whenever the convulsions returned. He became better gradually, and was rational in the morning.

July 15. Abscesses developed where the ammonia had been injected. They were opened and a large quantity of pus escaped.

He became stupid and lost all reason about this time, and appeared "idiotic." The abscesses were dressed daily, but he grew weaker and worse, and died in two weeks afterward, on August 4, of septicæmia.

CASE No. 3. "Doc" M. July 13, 1881. Aged 43.

When admitted was unconscious. Pupils dilated, pulse 72, and weak; temperature, 96. [Had been treated before his admission.] He was sent to the medical ward from the accident ward. On his arrival there it was found that his temperature had risen to 106. Pulse quite rapid and weak; stertorous breathing; contracted pupils; profound unconsciousness. His temperature was reduced by cold. Stimulants were administered hypodermically. He remained unconscious for a day or two; this was followed by delirium, which in turn continued for a few days, and then he appeared to be rational, though he was flighty at times. A day or two later he sat up and was much better. A week after he was walking about the ward. In the mean time it was discovered that he took outside about 3j of morphia every week, and was a hard drinker. A day or two later he had nervous attacks, a "general tremulous" condition of all the muscles of the body, with sleeplessness and easy fatigue, and unsteadiness of speech. Thinking this was in a measure due to the sudden withdrawal of the whiskey and morphia to which he had been accustomed, small doses of morphia were

ordered for him. At this time he was quite rational, but absolutely refused to take the morphia, saying he wanted to break off the habit.

*July 24.* He was about the ward apparently rational, and gave material and intelligent assistance to the *interne* in treating cases. In one case particularly, where a man was inclined to refuse all medicine offered, he displayed a great deal of ingenuity in getting him to take it. His condition was about the same from day to day.

*August 6.* Nearly four weeks after admission, while talking to him, the *interne* discovered that he had just begun to recollect things. He had never heard of the man with whom he had displayed so much ingenuity in getting to take medicine; did not know he had been sick himself. In short, this whole period of some three weeks and more was a blank in his memory. He recovered fully, and was discharged well.

Sunstrokes can very appropriately be arranged into three varieties:—

I. Marked congestion of brain, denoted by contracted pupils, unconsciousness, full, rapid, bounding, incompressible pulse, high temperature and congestion of surface, particularly well marked in the upper extremities and head and neck, great difficulty of respiration, and at times *convulsions*. In these cases the heart's action was reduced, when the temperature was reduced.

II. Partake of the nature of the first, with the symptom added of great enfeeblement, or depression of the heart's action, instead of increased action of the heart; in other words, the heart's action is changed, possibly by involvement of the cardio-inhibitory centre.

III. Cases of profound depression, where the patients lie unconscious, dilated pupils, pale face and lips, pulseless at the wrist, very feeble and rapid action of the heart, shallow and insufficient respirations, and often, after return of consciousness, still retain a weak and rapid pulse, and a general enfeebled condition of vital force, as shown by muscular effort, weak stomach, etc.

#### CONDITION OF CASE CONSIDERED IN REFERENCE TO TREATMENT.

It will be noticed that the three classes of cases are marked by a great difference of the symptoms, and that the treatment varies with the symptoms, "in other words, no set line of treatment for sunstroke can be laid down." The treatment is entirely *symptomatic*, and needs careful and accurate observation, in order to be able to treat them scientifically or satisfactorily.

The symptoms demanding most attention and most active treatment were,—

1. Temperature. (a.) Elevated; (b.) Depressed.
2. Heart. (a.) *Increased action*, being rare and not in any of our cases requiring treatment; (b) *depressed action*, calling forth all means, often without avail.
3. Convulsions, with opisthotonos, demanding careful administration of ether.
4. Respiration. (a.) Difficult and slow, connected with spasmodic con-

ditions of larynx; (b.) failure of respiration; three, requiring artificial respiration;—two patients were saved in this way.

After treatment had reference to the condition left, the former habits, and the indications in the weather: first, prevention, ice caps, and cold cloths to head; second, nourishing diet, tonics, and small amounts of stimulants.

#### METHOD OF TREATMENT PURSUED. — IMMEDIATE TREATMENT.

1st. *Temperature*.—(a.) Temperature below normal. Warm flannels, wrung out of hot water, and warm beef tea, by mouth or per rectum.

(b.) Elevated temperature were treated by *cold* in some form. Where  $103^{\circ}$  and above, baths cooled from  $95^{\circ}$  to  $90^{\circ}$ , and careful watching of the temperature of the body, to see that it did not get below normal. Where the case required repeated baths, sometimes cold packs and sprinkling with ice water was resorted to. Small pieces of ice, with the edges carefully rounded, were placed in the rectum until it was packed full, and in all cases ice caps were applied to the head in or out of the bath.

2d. *Consciousness*.—In order to stimulate the return of consciousness, ice water was poured on the forehead in small amounts and in a continuous stream from a height, thereby using the “reflex action” of the fifth nerve to arouse consciousness.

3d. *Convulsions* were controlled by careful administration of ether, enough to get the cerebral centres quieted, yet not enough to produce depression in them.

4th. *Respirations* were stimulated by ether and atropia hypodermically, using 15 m. ether and  $\frac{1}{40}$  to  $\frac{1}{120}$  gr. atropia.

5th. *Pulse and Heart*.—Failure of the heart in both “anæmic” and “congestion” varieties, was a most alarming symptom. Intermittent action of the heart was controled by digitalis or by digitaline. The force of the heart was sometimes increased by it. The other agents used in stimulating the heart were whiskey, ether, atropia, and aqua ammonia.

6th. In the marked cases of the congestive variety, hot water treatment was tried: baths of a temperature of  $110^{\circ}$ , and patient immersed, with his head surrounded by ice caps, and with cold water poured on it, with the view of increasing the capillary circulation of the body, and thereby decreasing the amount of blood going to the head. In all cases where this was tried it was unsuccessful.

#### MODES OF ADMINISTRATION AND WAYS OF REDUCING THE TEMPERATURE.

*Reducing Temperature*.—In all cases where the temperature was  $102^{\circ}$  or below, sponging the naked body, first with tepid water, and afterward with successively colder and colder water, advancing by a few degrees each time, seems the best, easiest, and most satisfactory way.

Above  $102^{\circ}$ , baths cooled from  $95^{\circ}$  to  $90^{\circ}$ , with careful watching, seemed the best, although circumstances required us to resort to “cold packs.” A sheet closely tucked over the naked body, and using hydrant water at first, and in cases of persistent high temperature, finally resorting to colder and colder water, until you reach ice water. In all cases the heads were covered and surrounded by ice caps and bladders filled with ice.



*As regards Administration of Remedies.* — The order to which preference should be given is about as follows, though we were guided by the effects obtained : first, by mouth ; second, by rectum ; third, by hypodermic ; fourth, by inhalation.

*By Mouth and Stomach.* — In most severe cases, unconsciousness, convulsions, vomiting, or other difficulties, made the administration by the mouth difficult and tedious, when rapidity was necessary ; and in other cases, where the stomach was overloaded with beer, etc., vomiting followed so that much time and medicine was lost ; again, in greatly prostrated cases with very weak and rapid pulse, absorption, or the effect as noted from the medicine, was slow in coming. Still, in certain cases, where rapidity was not desired, and when it could be used, it was found to be easy and undoubtedly proper ; and in cases where the action is not sufficient, other means can be resorted to.

*By Rectum.* — Many severe cases had relaxed sphincters, and others had diarrheas and involuntary discharge of feces. In all cases of this kind, the method of administration by rectum had to be abandoned for others. Whiskey, warm beef tea, tincture digitalis, and carbonate of ammonia, were used, and the effect appeared to be better and more rapid than when administered by the mouth, and suitable to cases where, for other reasons, the stomach could not be reached.

*By Hypodermic.* — In cases where rapid action is necessary, and where other means fail, this can be used, by combining a number of different agents. You can undoubtedly get a larger amount of stimulation than by any one agent, and with less danger of producing bad effects from too much of a single remedy. *Digitaline* for the heart, when intermittent, *ergotine* for contraction of the capillaries, *atropia* for stimulating heart and respiratory centres, *whiskey* and *aqua ammonia* and *ether* for stimulating effect on the heart.

Carefully noting your case and its symptoms, you choose the one best adapted to the symptoms. If you do not get a good and rapid effect by the others, and where death seems inevitable, "heroic treatment" by hypodermic of aqua ammonia, as in Case No. 2 (Mike B.), is justifiable and right. Experience seems to show us that deep injections of aqua ammonia, diluted one fifth, do not often produce an abscess. You can use alcohol or water for diluting it.

*Amount or Doses Administered.* — (1.) Ammonia carbonate, 20 gr., repeat 2 hours. (2.) Whiskey,  $\mathfrak{z}$ j.  $\mathfrak{z}$ ss. and repeat p. r. n. (3.) Tinct. digitalis, 10–20 gtt., repeat p. r. n. (4.) Digitaline (hypod.),  $\frac{1}{20}$  –  $\frac{1}{60}$ . (5.) Ether, 10–20 m. (6.) Aq. ammonia, 10–60 m. (7.) Whiskey (hypod.), p. r. n.

We found we could not adhere to any established doses ; and in all cases were guided in frequency of administration and amounts given by the effects produced.

Ether administered by inhalation produced three effects, not all noted in the same case : First, it sometimes stimulated the pulse, which became stronger and less frequent ; second, it made respiration easier and deeper ; and third, it quieted convulsions.

## XXXII.

### TWO SUGGESTIONS CONCERNING HEALTHY BUILDINGS.

By W. C. VAN BIBBER, M. D.,

*Baltimore, Md.*

THE first suggestion is to build houses upon arches, particularly in cities situated in low flat grounds upon navigable waters, and also in the country where the soil is alluvial.

The second suggestion is to build a certain class of houses in our cities with flat roofs, with or without a clear story beneath them, and that some of these roofs be improved as gardens. The houses particularly designated in this certain class are back buildings, low warehouses, small manufactories, stables, etc. What I will say concerning these suggestions will have reference both to public health and individual comfort.

Man has at least the department of building under his own control. He must take the earth as he finds it; but one style of building may be more healthy, useful, or convenient in one situation than another.

In the beginning of this paper, what I will request of you is to divest your minds, as far as you can, of any bias in favor of the present or the old-fashioned modes of building houses in cities, or even in the country. You all know the effect of early prejudices, the tyranny of fashion, and the difficulty of introducing any reform. The suggestions I have made are radical changes from the present style of building; and in order to judge of the merits of these proposed alterations, will require from you entire freedom from prejudice. A brief description of the kind of buildings which are proposed will first be given, in order to show the principles involved, and afterwards a few of the advantages expected to be derived from this mode of construction.

In the city in which I live there is a building which was erected fifteen years ago, and as it is, in part, an illustration of the suggestions which have been made, a short description of it may serve the purpose of a more extended explanation. The building is twenty-five feet front by forty in depth, and is erected on a lot 140 feet deep, in the rear of a dwelling. The first thirteen feet of its height, which may represent the suggested arch, is used, for the convenience of its owner, as a stable; and above this stable, the next twelve feet in height, is a clear story used as a gymnasium; and these two stories are surmounted by a large basin also twenty-five by forty feet, and which is three feet and a half in depth. This basin, being water-tight, and properly filled with earth, is used as a garden or common sitting or pleasure place for the family in good weather, having grass, plants, and flowers growing upon it. This garden communicates with the second floor of the dwelling

proper, and is twenty-eight feet from the pavement. The manner of constructing this building was simple. It is built for the most part with large timbers, framed in no uncommon way ; but the garden is supported by large beams and truss-beams, in order to sustain the heavy weight of earth. The floor and sides of the basin were made of inch and a half flooring boards, the sides having a flare of a few inches. The sides and floor were then covered with the "tar-roofing," and upon this, also both sides and floor, asphalt roofing blocks made for the purpose and cemented together with the usual hot cement, were laid. A layer of clay, six inches thick, was put upon these asphalt blocks. Three inches of the clay, being tempered, was rolled into flat cakes, and the other three inches was well puddled clay and laid on with shovels. When the clay was dry and the cracks secured, water was let into the basin to test the water-tightness of its construction. When this was found perfect, six inches of gravel was thrown into the bottom of the basin. Upon this, earth of a good quality was thrown, leaving a rim of about three inches at the top of the basin. The gravel gives a system of underground drainage, through two outlets near one end of the garden, towards which there is a fall of a few inches. This is a drainage similar to that of a "blind-ditch" in a meadow. The surface drainage is secured by the rim, which prevents overflow, and two down-spouts, towards which upon the sward there is also a fall of a few inches. The temperature of the air on the top of this garden is from two to five degrees lower, in hot weather, than that about three feet from the pavement. The air is fresher as well as cooler, and more invigorating than that nearer the pavement, which is heated by radiation from the bricks, and would be tainted in many situations by emanations from the streets and gutters.

In all compactly built towns, but particularly in our larger western and southern cities, the air on the plane of the second or third stories of ordinary dwellings is more agreeable and healthy than that in the basement or ground floors. Where yellow fever prevails it is recommended by physicians to sleep and live, as much as possible, in elevated apartments. The air held within an area of crowded buildings being obstructed as to its natural average motion by walls and fences, is prevented from a free ventilation, and is stagnated in streets, alleys, yards, and courts, to every degree of closeness. There is no chance for a free surface ventilation, and during close weather, in such situations, for many days at a time, the same air is retained with but little change.

It is to be regretted that our knowledge concerning the emanations of gases and air from the crust of the earth is not more certain. That the earth does perform a function somewhat analogous to human respiration, is most probable ; that is, the air penetrates the soil and water to a certain depth, is there changed, as in the animal lungs, and is again exhaled or expired through the pores of the earth or water. How much the expired air is changed in different situations, is always a subject for scientific inquiry. It is reasonable to suppose, that such atmospheric changes may be excited into action by laws similar to those which govern the motions of the air at different temperatures. Whatever may be the causes which originate, or the



laws which govern, terrene emanations, their existence cannot be questioned. In alluvial soils cellars are damper and more unpleasant than in primal formations, and obtain, and retain, an air which gives life to moulds and various air-plants.

Now, instead of springing the houses out of the ground in such situations by digging cellars, and continuing the communications with the houses above by solid walls, it is suggested to build arches as the foundations for the houses, so that a stratum of air may be interposed between the interior of the dwellings and the earth.

What advantages may be expected by such a change from the present style of building? As already said, surface ventilation of the air would be one prominent advantage. Cleanliness, surface drainage, convenience in city life, an abatement of certain nuisances, and consequent increased healthfulness, would be other advantages. It is not necessary to enumerate before this convention all the machinery which can now be so easily procured for carrying out the details of this desirable object. It is well known that such appliances are now at hand. Substitutes for cellars are being invented and put on the market; manufactories for asphalts and artificial stone are being established; convenient receptacles for holding the refuse and effete matters of a family are already made, so that such refuse can be readily transported to a distance without odor. Indeed, every detail for carrying out the conveniences for this principle of arch-building can now be obtained at moderate expense for even the largest cities.

The many kinds of elevators or lifts now in use, gives the idea a feasibility at present, which it did not have a few years ago. The hand, the steam, the hydraulic, and the gas motor elevators, are now commonly used. Arch-building, as well as the flat-roofs, are particularly adapted to southern cities, which are now rapidly advancing in importance, and where, in the near future, large amounts of capital will be invested. The ordinary perplexities and sufferings of mankind in general would be much relieved by this kind of building. As a negative good it would prevent the ground from being penetrated by sewers and pipes, or studded by pestiferous sinks of different kinds. Arch-building would solve the question of drainage in these cities built upon navigable water, where the land is low and flat and but little elevated above the tide, or the banks of the rivers at high-water, as in New Orleans. It might solve the question of drainage in this city. It is by water that foul places are washed and cleansed, and what chance is there to do this, in a large way, when there is no fall or flow for the water? What is called drainage in cities thus situated only results in hiding and accumulating excrements and refuse matters for future bad effects. As an illustration, examine the city of Savannah, where we are now. The water in the river is but a few inches lower than the highest hill in the city. In some other cities, as in New Orleans, the land is even lower than the water. It would probably cost less to raise the houses in that city upon arches, pave the earth at a small grade, and organize an efficient plan for the removal of nuisances, than any system of drainage that has yet been proposed. The great essayist of a former age has said, "I would have every

one write what he knows, and as much as he knows of it, not only on this, but on every other subject." The difficulties of the drainage question are universally known, where there is no fall for water. Carrying away the offals, and keeping a city clean by means of arch-building is entirely another thing. If any of you should think, at first, that these ideas are impracticable, reflect upon them, for they will bear comparison with the old style of building. They are given here with a view to elicit comment and excite study.

As it regards the flat-roofs, with or without gardens upon them, they are beginning to be spoken of already in some of the cities of this country. Their attractions and usefulness must be admitted. It is one of the objects of this paper to multiply their friends and show their practicability. It is not proposed, as yet, to suggest them for the main structures of private dwellings. But for the "certain class" of houses mentioned the tin, tar, or shingle roofs answer only the one single purpose of protection. The garden-roofs will protect as well as they, and besides this, they are beautiful, healthful, and hence trebly useful, although, in money, they need not cost three times as much. Some histories record that Queen Semiramis used lead in the construction of the celebrated hanging gardens of Babylon, but none was used in the garden already mentioned, which is more than twenty times less than the supposed dimensions of her's, and has not leaked in fifteen years, but seems to be equally sound as to its earth and timbers as when new. It was a boast of the renowned architect of St. Peters in Rome that he would swing the Pantheon in the air. Imagine cities like Savannah, where we are now, or New Orleans, or Washington, swung in mid-air with their gardens thirty feet from the earth.

There is scarcely a limit to the many uses to which such flat-roofs may be turned. In cities where cisterns are necessary they may be made into filters. This subject might be carried to greater length, but there are members of this convention, and others throughout the country, who can do this hereafter, in a more fitting time and place, with greater detail.

Permit me to say, in conclusion, that the two cities which should be most likely to give positive results from such suggestions are New Orleans and Washington city. It is more to the interest of their inhabitants to try practical conclusions with such a style of architecture. New Orleans, on account of the immediate benefits to the health and comfort of its people; and Washington, because it is the capital of the nation, and should give example of progress. Again, imagine this national city with many garden-roofs tastefully ornamented. Will not the glare from the back buildings with the tin roofs induce some one wearing golden spectacles to try the experiment? Those immense sewers under the ground, in Washington with the history of the National Hotel disease already written, and the ague in the White House, are they nothing? or, are they to be remedied? It would be a worthy monument for any man, if the arch of triumph in this case could be made the building arch.

## XXXIII.

### THE DISPOSAL OF THE DEAD.

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IN the disposal of the dead three principal methods have been employed by all nations and tribes, viz., *Exposure*, *Inhumation*, and *Embalming*.

Each of these prime methods are capable of numerous subdivisions, dependent upon the social and intellectual status of the nation or tribe.

Whatever the method employed, it has usually been one intended to express toward the dead some sentiment, as fear, revenge, solicitude, affection, etc., etc., inherent in all individuals, whether civilized or not. The method, together with the obsequies attending the final disposal of the body, have also usually been intended to express certain of the religious sentiments of the survivors.

With hardly an exception, the belief in the existence of an immortal soul, and oftentimes of the immortality of the body as well, have been fundamental doctrines with all tribes and classes of men whether civilized or not, and the disposal of the body has often been made with direct reference to the supposed welfare of the soul. This is illustrated in the customs of the Turks, who hasten to bury the body, believing the soul to be in torment until the body is thus disposed of.

Of the three prime methods mentioned I am disposed to give preference, in point of antiquity, to *exposure*. This being, I think, the most logical conclusion, when we take into consideration the barbarous nature of primitive man, and the low grade of intelligence and morality of which he was possessed.

Most authorities give precedence to burial, and probably, so far as we have any historical or other positive evidence, this is correct; certain it is, however, that the method employed is not distinctive of intelligence and culture, as we find all three of the primitive methods, with their various local modifications, in use at the present day by tribes and nations differing widely in social and intellectual development.

As an illustration of the different methods now in vogue, we may mention the customs of certain tribes in Africa, who drag their dead into the forests and leave them to be destroyed by wild animals. The Osage Indians, having a fear and horror of death, will no more occupy a hut in which a death has occurred, but leave the body a prey to carrion birds. Some of the tribes of Brazil cast the dead body into some pool or ditch; other tribes of South America tie a weight to the body and sink it in some lake or river, which is but another method of exposure.



A similar practice is in vogue among the nations of Guienne, who, like the ancient Ichthyophagi, throw their dead into the sea.

The Kamchatkan, looking to the happiness and welfare of the soul, keeps certain dogs for the express purpose of devouring the dead, believing that those who after death become food for dogs will be furnished with fine dogs in the world to come.

Probably the most enlightened sect that practice exposure at the present day is the *Parsees*, who erect high towers, properly called "towers of silence," on which the dead are exposed to the ravages of the vultures that haunt their vicinity. A single remove from the practice of exposure, pure and simple, is the custom of the Moors, who cover the body with stones and thorny shrubs to protect it from beasts and birds of prey. The Colchians anciently suspended the bodies of men to the branches of trees, but buried the women. The Todas burn all except children who are victims of infanticide, these are buried. The Ghondo and Bils of Africa, burn the men and bury the women. The Muddikers bury, but burn lepers, probably for sanitary reasons. The Kalmucks follow all modes.

Among nations who bury their dead, the same diversity of customs exist as among those who practice exposure: some burying in expensive coffins or sarcophagi, often within or near their dwellings, others carrying the body to almost inaccessible caves or clefts in the rocks or mountains, or depositing them in hollow trees.

Neither does the use of a coffin seem to be a distinctive test of culture, as the Mohammedans use no coffin, while some of the lowest tribes, in point of intelligence, use coffins hollowed from trees, or make use of boats for this purpose.

Herodotus, Cicero, Lucan, Spondatus, and others, give accounts of Asiatic nations who devoured those slain in battle, and killed and feasted upon the sick and aged.

Embalming the dead, while of great antiquity, and though practiced to some extent at the present day, does not seem to have ever been a favorite method, and has practically become a lost art; in fact it never seems to have been employed until the human race was quite highly developed, and never seems to have prevailed as a universal custom to the exclusion of other modes, but rather to have been confined to the rich and noble of the nations employing this method.

The ancient Egyptians attached great importance to the preservation of the body, believing that so long as it retained its form, the spirit hovered near, and was capable of ministering to its friends. Their ingenuity was therefore aroused, and by means of drying the body, salting, smearing with wax and honey, stuffing it with cedar dust and aromatics, coupled with the peculiarly dry climate, they succeeded in producing a mummy capable of enduring, practically, forever.

At first these bodies were placed in vessels of glass, clay, or wood, and preserved at a distance from any dwelling, in some isolated cave, or covered with dry sand. These customs did not long continue, however, and the bodies came to be kept in the dwellings of sorrowing relatives, until large

numbers became congregated in each house ; as a consequence epidemic diseases became prevalent, and baffled all skill, until attention was directed to these collections of dead bodies as the cause, and their removal to a distance was followed by a cessation of the plague.

Our present funereal customs are probably largely derived from those of the ancient Greeks and Romans. Among the Greeks, the most ancient method of disposal of the dead was by *inhumation*. Their custom was to bury in the open fields, upon the sea-shore, at the foot or top of high mountains. Pausanius has left a remarkable list of the celebrated graves of his day. In the end, the Greeks seem to have adopted the custom of burning their dead, probably in imitation of the Phrygians. At first this rite was esteemed a high honor, and was only allowed to those chieftains who had distinguished themselves in battle, or had rendered valuable services to their country. The custom finally came into general use, and was practiced to a greater extent than in any other country. The ashes were preserved in urns, and kept within private houses, and sometimes within the temples.

The customs of the Greeks and Romans in relation to the disposal of the dead seem to have been nearly identical ; they also seem to have recognized earlier than any other nation the baleful effects of intramural interment, and to have passed stringent laws prohibiting the practice.

Most of the celebrated Grecian legislators made these laws an important part of their codes. Plato even went so far as to prohibit burial in fields fit for cultivation.

The ancient Romans held the dead in great veneration, and believed that the souls of the unburied must wander for a hundred years along the Styx. Hence the custom of strewing with earth the corpse accidentally met.

It was a great crime in ancient Rome to disturb the contents of a grave, or to deny an enemy decent sepulture. Historians tell us that the Greek and Roman soldier would run any risk to himself, and endure any hardship to secure the corpse of a friend slain in battle, that it might not be denied the privilege of the funeral pyre.

There is no doubt but what burial preceded the burning of the dead among both the Greeks and the Romans ; none were, however, permitted burial within the city walls of Rome except the vestal virgins, who seem to have been allowed privileges denied to sovereigns. In the course of time the privilege was extended to the most illustrious, and finally the honor was abused to such an extent, and the evils consequent upon the practice were so glaring, that at the commencement of the fourth century it became necessary to enact the famous Twelve Tables, part of which we give, as showing the evil effects of burial customs similar to our own, which were recognized by enlightened nations sixteen hundred years ago.

*First law.* — Let no dead body be buried or interred within the city.

*Second law.* — Let all costliness and excessive wailings be banished from funerals.

*Fifth law.* — Let not the women tear their faces or disfigure themselves or make hideous outcries.

*Sixth law.* — Let not any part of a dead body be carried away in order to perform other obsequies, unless he died in war or out of his own country.

*Seventh law.*— Let no slave be embalmed ; let there be no drinking around a dead body, nor any perfumed liquors be poured upon it.

*Eighth law.*— Let no crowns, festoons, perfumed pots or any kind of perfumes, be carried to funerals.

*Eleventh law.*— Let no gold be used in the obsequies, unless the jaws of the deceased have been tied up with a gold thread. In that case the corpse may be interred or burned with the gold thread.

*Twelfth law.*— Let no sepulture be built, or funeral pile be raised, within sixty feet of any house, without consent of its owner.

In the early days of Rome and Greece, before the introduction of cremation and other sanitary laws relating to the disposal of the dead, it was the common practice to bury, not only within the city walls, but within the family dwellings ; there was even a law in Thebes forbidding any person to construct a dwelling without providing a suitable repository for the dead ; as a natural consequence, these congregations of the dead soon rendered the city very unhealthy, and led to a removal of the dead to without the city walls. We read of a certain part of the city of Rome that became so unhealthy that the Emperor Augustus gave a large part of one of the cemeteries to Mæcenas, who so completely purified it and changed its character, that it became one of the most beautiful parts of the city. He then built thereon a beautiful villa, to which the Emperor frequently repaired for fresh air and repose.

During the numerous and bloody wars of the republic, and the incursions of the barbarians, it became a pressing sanitary problem with the Romans, how to dispose of the dead. Embalming was not practical. Burial was too slow and every way unsatisfactory ; while the great veneration in which the dead were held would not permit exposure, even if for other reasons it had been desirable. Cremation solved the problem, offering as it did the most complete protection from infection, was perfectly respectful to the dead, and at the same time afforded a splendid opportunity for the performance of those religious rites so dear to those children of superstition. Cremation then became common, the ceremonies accompanying it, however, varying with the wealth and importance of the deceased.

During the early days of the empire cremation was sanctioned by universal custom, although it was never obligatory, and was always objected to by some, whether for sentimental reasons, or because of the costly nature of the rite, we are not informed ; the practice was finally discontinued in Rome during the reign of the Emperor Gratianus, for the reason, we are told, that it caused numerous fires. It hardly seems probable that this could have been the true reason for its discontinuance. It was probably the result of numerous causes, among which we may reckon the restrictions imposed upon the extravagant customs employed in performing the rite, which the legislators were forced to enact, and also the fact that the quarries near the city afforded an opportunity for the disposal of the dead in a way at once simple, cheap, and healthful, while it conformed to the wishes of a class.

The early Christians of Rome adopted the mode of burial in preference to cremation, from the fact that a principal tenet of their belief was the literal resurrection of the dead at the final coming of Christ.



Their first interments were made in the catacombs, to which they resorted for the performance of their rites and ceremonies. Persecution was rife and the number of martyrs legion, and particular galleries were set apart for the reception of their remains.

As the sect increased in numbers and power, they abandoned the dark and gloomy catacombs for the performance of their ceremonies, and sought the light of day. Some wealthy citizens having become identified with the sect, donated portions of their estates for the use of the church, and in these concessions the bodies of the faithful were buried, and so originated the first Christian cemeteries.

In these cemeteries altars were erected and chapels built to serve as protection from the elements during the performance of the obsequies and other ceremonies. To these chapels were conveyed the bones of the martyrs, and the belief in the vicarious efficacy of these relics served as a strong incentive to the donors of the land, and the high officials of the church, to seek sepulture for their bones near those of the blessed martyrs, and beneath the chapel walls and roof. The pressure of these claims soon led to so great a violation of the laws relating to burial, that Hadrian was compelled to restore them to their full vigor, and Antoninus Pius extended their sway to the whole empire.

The law for a time was strictly enforced ; but at the end of a century and a half we find that the Emperor Diocletian was obliged to issue new decrees. At length the opposition the Christian Church had met with during its early years was overcome by the conversion of the Emperor Constantine.

The temples within the city walls, that until now had known only the worship of heathen gods, were practically deserted, and were finally purified, and to them conveyed the altars and relics from the catacombs and chapels without the city walls.

The inordinate faith in the efficacy of relics, with its resulting violations of the burial laws, was for a time held in check, but obtained the mastery on the death of Constantine. This strong pillar of the church seemed to demand some recognition greater than had been accorded his predecessors, and he was therefore buried beneath the porch of the Church of the Holy Apostles. This paved the way for several of his successors, who had been great benefactors of the church, and in time the privilege was extended to others who had founded chapels or contributed liberally to the decoration of the altars, etc., until in time the indulgence was sold to the highest bidder. The practice was well illustrated in the epitaph of the man who, having too little wealth to secure a tomb near the altar, did the best he could for his bones, and inscribed this comfortable sentiment upon his tombstone : —

“ Here I lie, beside the door,  
Here I lie, because I ’m poor ;  
The farther in, the more you pay,  
Here I lie as well as they.”

In Constantinople and other cities of the empire the abuse of the burial laws became so general that Theodosius the Great, with the Emperors Gra-

tian and Valentinian II., were obliged to reissue edicts against the practice. They not only prohibited interments in towns, but ordered all bodies, urns, and memorials removed from within the walls to a distance. During the sixth and seventh centuries, the violations of the laws against intramural interment again became general and flagrant, and we find Gregory the Great complaining of the system of "voluntary gifts," that procured for the rich and venile privileges denied their superiors during the earlier years of the church.

The centuries following the pontificate of Gregory, down to the Council of Trent, were but a repetition of those preceding them, so far as this question is concerned; on one side we find the various popes, bishops, and ministers, with hardly an exception, ostensibly proscribing the practice of intramural interment, and no doubt many of them were sincere in their desire to uphold the laws and preserve the health of their subjects, but the fact remains that the "voluntary gifts" were made and accepted, and the inordinate self-love of the individual was constantly displayed in the struggle to procure for his poor carcase privileges denied his superiors, at no matter what cost to the public welfare. After all, it is a pretty hard matter to convince people that "death levels all," and laws have ever proved inadequate to the task.

May we not conclude from this hasty sketch of the origin of burial as now practiced, — the so-called "*Christian burial*," — and the continued warfare that has been waged against it by sanitarians, and even by the potentates of the church itself, that it is against the spirit of true religion and sound policy to continue it? The student of history and of ceremonial institutions cannot fail to see the immense power exerted by those rankest of superstitions, the vicarious efficacy of relics, and the literal resurrection of the body, in the formation of our present system of burial.

The hygienic dangers from burial *per se* were, as I have stated, recognized by the ancients; although they did not have the aids of modern chemistry, they seem to have discovered the fact that decomposing animal remains are not devoid of danger, but were capable of and did produce disease and death in the living.

That burial, as frequently performed at the present time, does not render the dead body innocuous, has been demonstrated time and again, and under almost every variety of circumstances, and yet we, in this year of grace 1881, are frequently informed that decomposing animal remains are not dangerous to health, and that the dead body once laid in the grave, there can be absolutely no danger to the living from it. The dangers to be apprehended from earth burial are usually classified as follows: —

- 1st. Contamination of water supply.
- 2d. Contamination of air supply.
- 3d. Direct infection, should it become necessary to reopen graves.

That these are not imaginary or fictitious dangers I firmly believe, and that they have been directly recognized in numerous well authenticated instances is simply a matter of history. I should not deem this part of the subject worthy of any words, but should treat it as a well established fact,

were it not for the publicity given to such articles as the one upon cemeteries, in the ninth edition of the "Encyclopedia Britannica," wherein the writer says, after enumerating the apprehended dangers from earth burial in a similar manner to what I have already given: "There is really no evidence in support of these serious allegations; on the contrary, there is much concurrent testimony which tends to completely discredit them." He then, after admitting that cemeteries may be mismanaged so as to become a source of danger, but treating this as a possibility very unlikely to occur, and saying that "only very ordinary precautions are required to render a cemetery perfectly safe," quotes from Mr. Holland, medical inspector for England and Wales, as follows: "*If* no more dead be buried in the soil than the free oxygen contained in rain and dew carried through it will decompose, and *if* such soil be left undisturbed until the processes of decay are complete, and *if*, as is almost certain to be the case, the use of such grounds for burial be discontinued at the latest when it becomes full of remains that do not decay, and probably long before, such places will be neither harmful while they are used for burial, nor anything but beneficial when such use of them is discontinued, as they will become large decorative gardens, or small parks, reservoirs of fresh air."

Thus, Mr. Holland. As will be observed, the word *if* is used like the mantle of charity, to cover a multitude of sins, and it hardly seems necessary to say that *very* few such cemeteries exist, and I do not know of one.

To resume our author of the "Encyclopedia": "With regard to the alleged peril from air pollution, it may be replied that there can be no danger, so long as the dead are laid in a sufficient space of properly planted ground, and at a moderate distance from any considerable number of houses, and for this purpose a mile is quite sufficient. . . . Whoever perceives any odor from a well kept cemetery? Yet if danger were present, the sense of smell would give unmistakable evidence of it.

"As to the question of water pollution, especial care is always taken to study the drainage of our cemeteries with reference to the neighboring sources of water supply; shallow surface wells, near a cemetery, are open to suspicion, as the water may be tainted by organic matter filtered through the soil, but suspected wells can be closed by the authorities, and it must be remembered that shallow wells are nearly always dangerous, whether they are near cemeteries or not. Deep wells are almost invariably safe, even near a cemetery, and in most places water is brought in mains from a distance, in such a way that pollution from cemeteries is impossible. As to the danger of infection, if it existed anywhere, assuredly we should have some evidence of it from the great cemeteries of the metropolis, yet there is not a particle of such evidence forthcoming; on the contrary, it is now very generally conceded that there need be little if any fear of infection from a dead body," etc., etc.

Undoubtedly, such a cemetery as is indicated by our author, would be highly desirable, and a great improvement upon any now in existence, if we except, perhaps, some of those in use by the Turks, which scientifically are far better adapted to the rapid decay of the body, and its undisturbed re-



pose, in that they use no coffin and bury but one body in a grave. The consequence is, however, that the cemeteries near their large cities, like Constantinople, occupy a much larger space than is required by the living population.

Undoubtedly earth burial can be performed in such a manner as to be practically harmless to the living, and the recommendations of our author are all good and valid ; but that they are always followed I deny, and I am inclined to think it very exceptional that any attention is paid either to the drainage, the number of bodies placed in a given space, or to any of the requirements admitted to be necessary to a healthy and well-ordered cemetery.

That the danger of infection of the water supply in cities which derive their supply from a distance, and distribute it in mains, is quite small, I am prepared to admit, but that this applies to the thousands of cities and towns throughout the country, whose dependence for water supply is wholly or in part upon wells, I deny. Neither are country cemeteries, so far as my knowledge goes, ever laid out with any reference or thought as to their sanitary requirements, convenience alone being consulted, consequently they are usually near the church, often in the heart of the town, or upon some knoll whose drainage is oftentimes directly into the wells in the valley below. Many others than he of the "Encyclopedia" have written lengthy articles, intended to prove the total innocuousness of earth burial, and quote high-sounding names (mostly French) in support of their theories. Without exception, they claim the total and absolute harmlessness of the products of decomposition, but usually, and unfortunately for the good of their argument, wind up with directions how to make a cemetery perfectly harmless, and unfortunately again, they do not agree as to what is necessary to achieve this result ; for instance, one advocates the thick planting of trees and shrubs to absorb the gases evolved ; another wants nothing planted, that the winds may have free access and dilute these harmless (?) gases. One advocates a light porous soil, through which the water can freely percolate, another thinks a heavy clay soil, with suitable drainage, better.

It is but charitable to believe the gentlemen mistaken who are so positive in their assertions that there is no evidence in support of the unhealthfulness of cemeteries, and the infectious qualities of the dead. Such mistakes are hardly excusable, however, when we consider the many authentic records with which the literature of the subject abounds. As for the so-called investigations they quote in favor of their arguments, all that need be said is that nearly all were made at the instigation of, and were paid for by cemetery associations, who had every interest in the result.

Much of this clamor comes from the city of Paris, whose citizens have long been trying to secure the removal of certain cemeteries to without the city limits ; indeed, laws were long ago passed ordering their removal, but have never been carried into effect, why, can easily be imagined.

Paris boasts to-day of the most "beautiful cemeteries in the world," and, leaving the sanitary question entirely out, the beauties (?) of earth burial are fully exemplified in this great metropolis. With cemeteries full to repletion a century ago, they are still made to do duty, and serve to enrich the mem-

bers of the cemetery association. The dead are buried in a common grave, holding fifty or more bodies ; the poor are buried gratuitously, those who are able are charged a fee, usually twenty francs, which is said to insure your grave from intrusion for five whole years. At the end of this time another tenant is put in. If you are very particular, and happen to have some antiquated notions respecting the sanctity of the tomb, for a double fee you may be permitted to rest undisturbed for ten years. At the expiration of this time you, and any tombstone you may have erected, must come up and make room for your successor. People go to Paris for their fashions, how soon will the natural increase of population compel us to adopt this one?

In Naples they have a custom similar to that of the Parisians. The Italians are quite a practical people, and look upon a dead body as only fit for soap grease, so they have a series of three hundred and sixty-five pits, one for every day of the year. Into one of these pits all who die within the twenty-four hours are put, there to rest until the trump of the archangel shall bid the dead arise. After enjoying the "sweet rest of the grave," that poets sing of, for three hundred and sixty-four and a fraction days, the trump (and in this case spades are trumps), indeed, bids you rise. Verily a man must indeed be a heathen to wish any other disposal of his body than this.

As we have seen, the dangers to public health from intramural interment were recognized by the ancient Greeks, Romans, and Egyptians, and the practice was prohibited among them for this, and no other reason. We have also seen that nearly every pope, bishop, and council of the Christian Church, have been forced to recognize the evil and prohibit it, notwithstanding the church had the strongest of pecuniary and other reasons for continuing the custom.

That proper precautions are not observed, and that carelessness or ignorance on the part of officials exist, is no doubt true, but it is no answer to the argument, but is rather a confession that such dangers do exist.

History teems with accounts of epidemics caused by animal decomposition. St. Augustine, Lucan, Marcellinus, and other historians, relate numerous instances of plagues arising from this cause. More recently, Piattoli in 1774, Navier in 1775, and Vicq d. Azyr in 1778, made exhaustive studies of the subject, and published voluminous works, containing arguments that modern chemistry has confirmed and not refuted. Later still, Ambrose Paré published numerous instances of pestilences caused by emanations from pits filled with dead bodies. But, as it has been charged that the advocates of the abolition of earth burial have no evidence not dug up from past centuries, I will not quote further from the history of the forgotten past, but pass on to more recent dates, and see if we can find any evidences of the noxious properties of earth burial.

In 1849 the city government of London had the question of the healthfulness of the city cemeteries investigated, and for this purpose a commission of gentlemen, selected for their high medical and scientific skill, were appointed, and their unanimous opinion, after a thorough examination into

all the facts pro and con, was that the cemeteries were dangerous to public health, and had been the cause of numerous and severe epidemics. In their report they say: "We may safely rest the sanitary part of the case on the single fact, that the placing of the dead body in a grave, and covering it with a few feet of earth, does not prevent the gases generated by decomposition, together with putrescent matter which they hold in suspension, from permeating the surrounding soil and escaping into the water beneath and the air above."

That the authorities having charge of cemeteries are not always the proper ones, or to be trusted as to the proper number of bodies to be placed in a given space of ground, witness this extract from their report: "In London, in some of the poorer districts, the soil of the churchyards was raised two, three, and even four feet, within a few years, and in the immediate neighborhood of such cemeteries epidemic diseases were both more common and more fatal. Within thirty years there had been interred more than 1,500,000 bodies in a space not exceeding three hundred and eighteen acres." This overcrowding is not an isolated instance, but is common in as bad or worse degree in nearly every large city in Europe, England, France, and we may almost add America.

The Board further states, in speaking of certain churchyards, "Their condition is abominable, and the smell revolting, and distinctly to be perceived in all the adjoining houses, in every one of which cholera or diarrhoeic diseases had occurred." Again the report states, that "cholera was unusually prevalent in the immediate neighborhood of London churchyards."

Dr. Lyon Playfair, of London, an authority whom few will care to question, says: "I have examined various churchyards and burial grounds for the purpose of ascertaining whether the layer of earth above the bodies is sufficient to absorb the putrid gases evolved. The slightest inspection shows that they are not thoroughly absorbed by the soil lying over the bodies. I know several churchyards from which the most fetid smells are evolved, and gases with similar odors are emitted from the sides of sewers passing in the vicinity of churchyards, although they may be more than thirty feet from them."

Sir Henry Thompson, who has written exhaustively upon the subject of earth burial, and who quotes nearly one thousand authorities as to its dangers, says: "Thousands of human lives have been cut short by the poison of slowly decaying and oftentimes diseased animal matter. The graveyard pollution has probably found a victim in some social circle, known to more than one who may chance to read this, and I need hardly add that in times of pestilence, its continuance has been often due mainly to the poisonous influence of the buried dead."

As to the exact manner in which cemeteries are detrimental to health, as yet comparatively little is really known. That the decaying human body, *per se*, is capable of producing any specific disease, I think no one will claim; neither is it evident that sewer gas, decomposing animal or vegetable matter, or the thousand and one influences confessedly injurious to health, are capable of producing any one particular malady.



The gases from the decomposing human body, together with the water that may have percolated through the remains, probably act in a similar manner to that of sewer gas and sewage water, that is as a bearer of contagious and infectious germs. In and of themselves they possess no property of producing disease, except in the same way impure air or water from any cause tend to cause disease, that is, by lowering the grade of vital energy of the individual, and rendering him more susceptible to the action of the particular disease germ, virus, or entity, whatever it may be.

Recent investigations tend strongly to prove the theory, that each particular infectious disease is caused by the direct reception into the body of a particular and specific disease germ, capable of producing in a suitable soil a particular specific disease, and no other.

Among the diseases supposed to be produced in this manner, may be mentioned typhoid and typhus fevers, cholera, yellow fever, perhaps diphtheria, and numerous other diseases, distinguished by the property of being conveyed to the human body from the soil, hence designated as filth diseases. When infection plays so important a part as it does in these diseases, it seems to be a necessity to admit the presence of a germ, be it animal or vegetable, or belonging to some unknown kingdom intermediate between the animal and vegetable. "A poison may kill, but cannot infect, still less multiply to an enormous degree."<sup>1</sup>

The investigations of Pasteur and others into the etiology of disease, have been productive of astonishing and oftentimes unlooked-for results, none more so, perhaps, than those concerning the disease anthrax, or splenic fever, an infectious disease peculiar to animals, but having a striking analogy to some of the infectious diseases of man, and bearing a close resemblance to pyæmia and septicemia, and to some extent to cholera and typhoid fever.

This is one of the oldest known infectious diseases of animals, yet it is but recently that anything definite was known as to its origin or nature.

Professor Pasteur has succeeded in isolating in the blood of animals afflicted with this disease a peculiar bacteria of rod-like form, which, upon infection into the circulation of healthy animals, produces anthrax, and no other disease. A proof almost incontestable that the disease was caused by this bacteria, an organism so minute that no filter can be devised, that will separate it from the blood, but which seems to be unable to pass through the placenta, is this: "Inoculation with foetal blood that does not contain bacteria, does not produce anthrax, while inoculation of the blood of the mother, that does contain bacteria, gives positive results." Now, if we accept this as final, we may claim that there is at least one infectious disease of which we have some definite knowledge.

Now how is this disease propagated? It is a well attested fact that animals free from the disease and not brought into contact with animals afflicted with it, may be preserved free from the disease indefinitely, but if turned into pastures in which animals dead from the disease are buried, and that too, it may be, at some time far anterior to the turning in of the well flock, the well animals are almost certain to contract the disease.

<sup>1</sup> Lebert.

It is also a well attested fact that the mortality from anthrax in flocks occupying pastures and yards in which those dead from the disease are buried is much greater than in those flocks where the dead are disposed of in some other manner. In one case the mortality decreased from twenty-one to two per cent. in one year on discontinuing burial.

These are significant facts, and one's first impression is that the disease germs are conveyed to the well animals through the grass; but this does not seem to be the case, as solutions made from the well-cleansed grass, and injected into the blood of healthy animals, do not produce the disease. Bollinger is strongly of the opinion that the soil occupies the role of an intermediate bearer of the anthrax germ, and is capable of retaining and preserving the germ in a condition capable of being revived for an indefinite period. He further considers the disease as highly contagious, and liable to be transmitted through mediate agents, as the soil, water, air, flies, etc.

Professor Pasteur has recently made known his investigations relating to earth-worms as a factor in the promotion of disease, and the dangers to be apprehended from them in the soil of church-yards. As to the disease in point, viz., anthrax, his investigations seem to be conclusive, he having cultivated the germ and produced the disease, by inoculation with the contents of the worm deposited in the form of "castings," brought up from the bodies of animals dead from the disease, and buried deep below the surface.

These facts accepted, we can readily see the risks we run from these humble denizens of the earth, when we consider their remarkable activity. Professor Darwin, in his recent work, gives some astonishing statistics of these ceaseless labors. In one instance mentioned by him twelve ounces of these "castings" were thrown up upon a single square foot of ground in one year, or at the rate of fourteen and one half tons per acre.

There is no reason to think anthrax an exception to the other diseases I have mentioned, and probably many more, in its nature and manner of propagation, and it only requires patient investigation to prove the truth or falsity of this theory of disease.

If disease is caused by specific germs, as now seems highly probable, we have still to learn the peculiar nature of each particular germ. The probability is that all are not alike infectious, and some may be destroyed by the processes of decay in the dead body, while others may find in this process the means of augmented life and activity.

It is quite in accordance with the germ theory of disease that fever germs find an excellent opportunity for multiplying in the moist and humid soils of some cemeteries, and but wait the action of water percolated through the soil, the evolution of gases from the decomposing body, the silent but energetic work of the earth-worm, or other equally effective agencies, to bring them in contact with the outer world, when they may speed upon their mission of pestilence and death. It is much easier to see, and more in accordance with science to believe, in the ability of disease germs to lie dormant for a time, lacking the necessary conditions for their propagation, and finally reappearing when these conditions do obtain, than it is to believe in any other of the numerous theories of disease, the exploded spontaneous generation and dispensation of Providence theories not excepted.

It is a well established clinical fact, I think, that only the most minute quantity of the "*materies morbi*" of disease, be it a virus, a miasm, a germ, or what not, is sufficient to reproduce the disease in its most virulent form, whenever it shall be deposited in a suitable soil, and under favorable conditions. This being the case, the initiation of an epidemic depends not upon the *quantity* of infectious material, nor upon the medium by which it is conveyed, but upon the quality of the soil upon which it finds lodgment, and there can be no absolute safety from infectious and contagious diseases, aside from the rapid and entire destruction of the *fons et origo* of the disease. That the dead do kill the living is only too true, and that cholera, yellow fever, and the whole list of zymotic and infectious diseases, are capable of being, and are, transmitted through the contamination of water and air supplies, is no more difficult of demonstration, than it is to prove the ability of sewer gas or sewage water to propagate disease. True, we are as yet unable to demonstrate the exact appearance of the particular germ of these diseases; but that such a germ does exist is, we may say, almost proven, and coupled with the known conditions of the air and water supply in certain epidemics, it rises almost to the plane of a demonstration, that these are the media through which the disease is propagated. The proximity of burial grounds to disease-infected localities is not to be explained on the theory of coincidence.

That the infectious germs of these diseases have never been seen, handled, or smelt, is but small proof that they do not exist, and such writers as he of the "Encyclopedia," who insist upon these conditions, as essential to danger from them, are best answered by the anecdote of old Dr. Lloyd, who, in 1795, made the remark that yellow fever was in the air. A bystander, whose faith in the literal accuracy of everything the good old doctor might say was beautiful and touching to behold, was greatly alarmed, and next morning bright and early went up on his housetop to look for it, but saw it not, and ever after said he did n't think much of Dr. Lloyd.

If more proof of the disgusting and hurtful qualities of earth burial is wanted, the evidences can be obtained in nearly every hamlet and city in the civilized world, and I would only weary you did I consume more of your time in quoting from the numerous authentic sources at command. There always has been, and I suppose always will be, those who esteem it a privilege or a duty to "snuff up corruption and call it a rose." And how can I better close this part of the subject than by quoting the words of the old sexton, in Sargent's "Dealings with the Dead": —

"How long, O Lord, how long, will thy peculiar people disregard the simple and unmistakable teachings of common sense, and the admonitions of their own proper noses, and bury the dead in the midst of the living? Above all, how long will they continue to perpetrate that hideous folly of burying in tombs? What a childish effort to keep the worm at bay, to stave off corruption yet a little while, to procrastinate the payment of nature's debt at maturity, — 'dust thou art and unto dust shalt thou return,' — for what? That the poor senseless tabernacle may have a few more months or years to rot in; that friends and relatives may, from time to time, upon



every reopening of the tomb, be able to gratify their morbid curiosity, and see how the worms are getting on ; that whenever the tomb is unbarred for another tenant, as it may be at a time when corruption is doing its utmost, its rankest work, the foul quintessence, the reeking deleterious gases, may rush back upon the living world, and, blending with a thousand kindred stenches, in a densely populated city, promote the mighty work of pestilence and death."

These are homely words, but unfortunately too true.

How, then, shall we dispose of the dead ? In answering this there are other questions beside those of a sanitary nature to be considered. Two of these, viz., sentiment and practicability, are likely to be important features in the final solution of the problem.

The emotions which prompt us to a loving and tender regard for the dead bodies of our friends, even though we are fully convinced that they are only clay, only effete matter passing from a higher to a lower form, are among the characteristics of civilization, and only among the lowest and most degraded of savages do we find an utter contempt for the dead manifested. All who have studied the subject are agreed, that among nations who acknowledge that the dead have some rights, the rights of the living and the amenities of society are more highly respected.

Says the venerable bishop of Toulouse : " This respect is a natural sentiment in every stage of society ; and depraved indeed must those be who do not feel it. No social ties could unite us if death were able instantly to extinguish affection in the hearts of the survivors. He who feels no emotions of grief or pity beside the grave of a fellow-being, could have borne no love to that being during life."

I am disposed to allow great weight to what is called sentiment, in the solution of this as well as every other social problem, provided the sentiment be of a healthful and decent nature ; but for the mawkish sentimentality of some of the advocates of inhumation, I have nothing but contempt. It is a false sentiment they display, because it has no foundation in fact, and is not productive of a single benefit, to any person or community.

Practical sentiment is always better than unpractical.

There are exceptional persons who look upon the dead body as something loathsome, and to be got out of sight as quickly as possible ; and any disposition that accomplishes this, no matter how, is all that is necessary. But among the large majority of persons there is, however, a strong desire that when they come to die their body may be protected from all violence, and be permitted quietly to return to dust, unobserved by mortal eye. With our present system of burial, this is a physical impossibility ; there is no security from impertinent meddling with our bones. Of this the ancients were aware, and the history of every land confirms it. Says good old Sir Thomas Browne : " Who knows the fate of his bones, or how often he is to be buried ? who hath the oracle of his ashes, or whither they are to be scattered ? "

Much of the disturbance of burial grounds, it is true, has been the result of necessity. The dead must make room for the living, and no matter the amount of foresight used, the plats of ground devoted to burial purposes

have necessarily had to give up their dead. Unfortunately the indignities offered the "uncomplaining dead" fill many a dark page in the history of the world. The love of gold and the demand for room, have been more potent than any sentiment of affection, respect, or common decency. Burial grounds intended for hamlets have been made to do duty for large and prosperous cities, and into space intended for hundreds, thousands and even millions have been crowded. To do this they had to be "managed" in a way so disgusting and shameful, I will not pain you with its recital. The sentiment of "rest in the grave" is beautiful in the abstract, but its utter falsity in fact, is evident to any one who has thought much upon the subject, and is perhaps nowhere more forcibly illustrated than in the disposal of the defunct Capucins. In one of their monasteries near Palermo, the bodies of over 2,000 are preserved in the cellar. Their plan is this: the body of a dead monk is buried in a subterranean gallery, in a grave, from which its former tenant has been removed, to make room for the new-comer. Perhaps the body has been permitted to enjoy the sweet rest of the grave for four years, rarely more than seven; as a consequence, the processes of decay are still rife; to obviate this, the body is placed in an oven and baked for a time, then dressed as during life, and hung up upon the wall, to serve as an object of peaceful and sentimental reflection to all comers. To complete the travesty, and render the argument for this mode of burial still more clinching, I would suggest the adoption of the American custom of hanging mottoes bearing, not the legend "God Bless our Home," that would be asking too much; but the still more impressive and cheerful one so often seen in church-yard literature: "Stranger, as you are now so once was I; as I am now so you must be; prepare for death and follow me."

But not yet is the poor body permitted to rest. Each in his turn is taken down, his bones scraped and cleaned, the long bones arranged in columns and festoons to decorate this gehenna, and the skulls used to build altars to the Most High God, over which prayers are offered, asking Him to aid his children in mortifying and lightly esteeming the mightiest of his handiworks, — the human body.

There may be a sentiment connected with this I cannot appreciate; but better far, and more intelligible to me, is the sentiment of the Hindu, who sees in the smoke of the ascending funeral pyre the soul of the departed wending its way to realms of bliss, and in the handful of ashes cast upon the waters of the Ganges, the reunion of the body with the universe.

Another objection to earth burial, aside from the legal and necessary interference with the remains, may be mentioned the criminal interference, or "body snatching." This evil has reached a magnitude in this country, greater, perhaps, than in any other, and is so great that no body is secure from the unholy rapacity of the ghoul. Rank and social position are no securities; law does not prevent it. The crime is increasing, and neither the corpse of the pauper, committed to the earth with the tears of a single friend, or the body of a martyred president deposited in a vault, provided with all the mechanical securities human ingenuity can suggest, is safe from the ravages of this fiend of all uncleanness.

The prevalence of this crime has led to the adoption of many elaborate and costly devices for the protection of the body, which are wholly beyond the means of the poor to secure. No matter how dear to him the body of his dead, the sanctity of the grave which common decency and the laws should secure to him are not for such as he, but only for those whose wealth will enable them to make use of these additional means of displaying their affectionate regard and tender sentiment for the dead. The growth of this evil has tended largely to revive the pernicious and disgusting practice of tomb and vault burial.

As a sanitary evil, the placing of dead bodies in tombs and vaults, is far greater than burial in the ground itself. The earth, doubtless, does absorb and decompose into harmless products a portion of the deleterious products of decomposition; in tomb and vault burial these products are confined, and allowed to escape, *en masse*, on every opening of the vault, or in the more improved (?) vaults, are allowed constant egress through so-called ventilators.

One more reason against burial there is, and one not connected with the sanitary or economic part of the question. No doubt there exists in nearly every one, at some time, a vague, it may be, and undefinable, but no less horrible, fear of being buried while yet alive. By most people, perhaps, and especially by that class who are able, from their peculiar organization, to take a philosophical view of this as of all other questions, the subject is at once dismissed as something very unlikely to occur; and if by any possibility it should, their sophistry convinces them it could scarcely be attended with any pain, and would probably not be realized. With others, and every physician has met with many such, the subject is one causing intense mental anxiety. Often have I been asked the possibility or probabilities of such an occurrence, and if there was no certain means by which to distinguish the fact of death. With some, call them monomaniacs if you will, the subject is one of paramount importance, and is a shadow that constantly attends them by day and haunts their pillow by night. Some certain and infallible sign, by which we might determine the fact of death, has been the dream of many pathologists. Large rewards have been offered for its discovery; but as yet the one certain sign, apart from the evidences of incipient putrefaction, is but a dream. Many evidences taken together, with the circumstances of the particular case, such as auscultation of the heart and lungs, the condition of the eye, the application of fire to the skin, the accession followed by the loss of rigidity of the muscles, etc., offer strong presumptive evidences of death. Yet it is but honest to confess, that the border land between death and seeming death is so narrow that the possibility exists of committing to the grave, and all that this implies, the still living body. No doubt most, if not all the sensational stories with which the public press abound, of bodies that have turned in the grave, are dependent, not upon the fact that the body was buried alive, but upon careless handling of the coffin, or upon the operation of the gases of decomposition. I am convinced, however, that there is not and in the case of epidemics cannot well be, the proper verification of death that the importance of the subject demands. Is not,



then, some method of disposing of the body, that offers complete euthanasia, better than our present mode? That our present system of burial does not meet the demands of a just and true sentiment, of love and respect for the dead, while at the same time offering a practical solution of the question, What is the proper sanitary disposal of the dead? I claim, and in support of this claim would again quote from the eminent London sanitarian, Mr. T. Spencer Wells, who says:—

“Decomposing human remains so pollute earth, air, and water as to diminish the general health and average duration of life of our people.

“Existing cemeteries are not well fitted as safe, secure, permanent, innocuous places of repose for the remains of the dead.

“The expenses of funerals and interment of the dead in graves presses unduly upon the means of the middle and lower classes.

“The present system of registration of death is so imperfect that common causes of preventable disease are not detected; and life is also rendered insecure by the omission of efficient arrangements for the due verification of the fact and cause of death.”

Have we, then, any means of disposal of the dead that is safe, secure, permanent, innocuous, and at the same time practical, reverential to the dead, and that offers no violence to the feelings or rights of the living?

In my opinion *cremation* fulfills these conditions better than any method yet devised.

The problem to be solved is thus tersely put by Sir Henry Thompson:—

“Given a dead body, to resolve it into carbonic acid, water, and ammonia, rapidly, safely, and not unpleasantly.”

The question—how to dispose of the dead—has been looked upon for many years as one to be decided by the peculiar sentiment and taste of the individual, and undoubtedly these elements must fill an important place in the solution of the question. It is, however, or will soon become a question of pressing sanitary importance, and as such must stand or fall upon its sanitary merits. If people's sentiments can be made to conform to the sanitary solution of the question, so much the better, and I for one do not see why they cannot. There are people who, when stripped of every other argument in favor of burial, claim that it is the most natural method. A poor argument, were it true. Nature is oftentimes a bungler, and performs her work by the slowest and most unsatisfactory methods. A limb is attacked by gangrene; nature might effect an amputation in time and spare the patient's life; the chances are she would not; any way, we do not wait to see, but call upon art to perform in minutes what nature, unaided, would require months to do. The case is similar with the dead body. If left to nature it would be resolved into its elements in time, and might spare the health and life of the survivor; the chances are it would not. Are then the processes of nature so holy that we may not in this case seek to regulate them to our profit?

Change is the one inflexible law stamped upon all created things, and we do not contravene nature's teachings when we help her to perform quickly the processes of her alchemy.

Another objection to cremation advanced by the sentimentally religious opponents to the rite is that it is a revival of an ancient pagan rite. Granted, but in this case we must admit that the heathen were wiser than we. Undoubtedly cremation originated among so-called heathens; what particular nation or race, we are unable to ascertain. It is quite rational to believe its origin to have been with some people who worshiped the sun-god *Ra*, and looked upon fire as the earthly representative of that god, and there seems to me nothing impious or unnatural in their seeing in the destruction of the body by fire, a reunion of that body with the to them divine element from which it sprang. I imagine that could those heathen be translated into this nineteenth century, and see how faithfully some self-styled Christians worship earthly gods, they would see in their vaunted affection for earth burial quite as heathenish a desire to be eternally united with their *mud god*.

Supposing cremation was originally a heathen rite, the same may be said of nearly every one of the rites of the Christian church of to-day, and more than this, the human child has grown too old to longer be frightened with the threatened ghost of a heathen.

No doubt Christianity, with its doctrine of the literal resurrection of the body, was largely the cause of the abolition of the custom of burning the dead, so long and universally practiced before the origin of the Christian church; but happily the doctrine of a literal resurrection has so completely died out, that any remaining straggler who may have the temerity to advance that as an argument against the readoption of the rite, may be effectually silenced by the question of Lord Shaftesbury, "What has become of the blessed martyrs?"

It is but a waste of time to enumerate or attempt to refute many of the arguments advanced by the captious opponents of cremation. There are but two worthy an answer, viz.:—

1st. Will not the ends of justice be defeated in the destruction of the means of detection of crime?

2d. Is not cremation too costly to be practical?

As to the first of these objections, in view of the great benefits plainly to be derived from the adoption of the custom, the disadvantages from this cause seem very insignificant. The resources of toxicology are so great at the present day that precautions highly necessary in the time of Lucretia Borgia are not required. Criminal poisoning is not a common crime now, and the vegetable poisons are seldom to be detected after death, certainly not if the body has laid long in the grave. Of the mineral poisons, very rarely are more than two or three used with criminal intent, and these, particularly arsenic and strychnite, present such plain and unmistakable ante-mortem phenomena as to render the necessity for the disinterment of the body an act of gross carelessness.

Dr. Bonfanti, of Milan, for twenty-six years official medico-legal expert of Italy, in a paper showing the fallacy of this objection to cremation, says that in all the cases of which he has had charge, many thousands in number, only ten have involved the exhumation of the body, and four of these

were where the murderer himself had buried the body to conceal his crime.

Sir Henry Thompson shows that not one in a million are ever exhumed for this purpose, and with an improved method of inspection, which seems to be demanded in any event, the dangers to be apprehended are absolutely infinitesimal. On the other hand, were cremation universally adopted, the crime of "body snatching," which in the eyes of the law is held barely second to that of murder, would necessarily be done away with. Of course the detection of all crime is highly desirable, and that of criminal poisoning particularly so; but it seems to me the custom or law that effects the greatest good for the greatest number coincides most nearly with our democratic principles. If there are, as is stated by eminent statisticians, more persons who die annually from causes directly attributable to our present system of burial than fall victims to the assassin's knife, a change in this system would seem to be desirable. Even if an occasional Brown does get more arsenic in his tea than is good for him, the whole Smith family may be saved from death by typhus.

Now as to the costliness of cremation. So far it cannot be denied that the incinerations that have been performed in this country have been attended with expenses that place the privilege beyond the reach of the poorer classes. That this is necessarily the case does not follow. As practiced by the ancients the rite was both costly and imperfectly done, the cost mainly depending upon the expensive wines and oils used in the performance of the religious ceremonies, and not upon the amount of fuel actually required; indeed, the process seems to have been conducted upon a very economical basis, in the case of some of the martyrs. Good old John Strype has told us to a farthing what it cost to cremate Cranmer, Latimer, and Ridley, viz.: £1 16s. 6d. for the three; this included fuel, carting, and even the chains and staples used to hold the pyre in position. They did n't waste any more sentiment or oil over martyrs in those days than we do over paupers in this. That incineration by means of pyres erected in the open air is costly, imperfect, and offensive to common decency, I am prepared to admit, and I do not wonder that those who may have read the accounts of such cremations as those of the poet Shelley, for instance, and little or nothing of the improved methods of to-day, should be disgusted with the very mention of the subject. The popular notion seems to be, that the body is to be submitted to a sort of roasting, frying process, attended by dense smoke, disgusting odors of burning flesh, and a whole nightmare of kindred horrors. Nothing of the kind, however, occurs. In the improved furnaces of to-day the body does not come in contact with the fire at all, only with an intense heat of 2,000° or more. At this temperature the body simply withers away into a pure white ash. The gases generated are burned in a separated chamber adapted to the purpose, and no smoke, odor, or other unpleasant phenomena occur to offend the sensibilities of any, be they ever so acute. To attain these nearly perfect results, of course costs money. The furnace cannot be erected in this country for less than three to five thousand dollars, — a mere bagatelle compared with the cost of some of our cemeteries.



The fuel necessary to attain this high temperature, with the necessary attendance, makes the expenses of the incineration of a single body about fifteen dollars. The actual cost of fuel when the furnace is once heated is only seventy-five cents to one dollar. The apparatus used by the Danish society at Copenhagen effects the cremation in about an hour, and costs only from five to seven shillings. After all, the costliness of cremation does not seem to be such a very great objection. Of course, if we are forced to send the body to Washington, Pa., to Milan, to Padua, or any other of the existing crematories, the privilege is placed beyond the means of any but the rich. But when the crematories are more numerous and accessible, as they no doubt soon will be, the necessity for an expensive lot in an expensive cemetery, an expensive casket, and all the pride, pomp, and circumstance of a funeral *a la mode*, may be dispensed with by those who, from necessity or choice, are able to see that death does level all.

I do not expect, however, that the cheapness or costliness of cremation will ever play any important part in the question of its final adoption. People always have had, and probably always will have, their individual notions as to how much money they will expend upon the funeral of their friends, and whether the money is expended upon a costly casket or a costly urn, the baker and the milkman will be obliged to see their just dues vanish in the funeral display, in the future as in the past; and as prodigious lies will sully the face of the silver or gold cinerary urn as ever disfigured the marble shaft.

In cremation we have, then, a method of disposing of the dead at once safe, secure, innocuous, practical, reverential to the dead, and that cannot interfere with the rights of the living.

Will it become popular, is the question; and the answer depends not upon its merits, which are evident, but upon people's prejudices, born of the long observation of the burial custom; to overcome these prejudices is the work, gentlemen, of such as you, acquainted as many of you are with the horrible and disgusting features of death, as none others can be; to you particularly belongs the moulding of public sentiment, that death may indeed come to be looked upon as a dreamless sleep and an eternal rest. It is useless to attempt to effect any great social reformation by means of any law. Cremation is no exception, and can never become popular through any law; there must first be the demand for it, and this demand must come from the educated and refined, for it certainly is an advance in the social scale, and a refinement upon our present dangerous and barbarous mode.

One of the most beautiful attributes of true refinement is displayed in the love for the home and family. The sentiment of affection for the dead, as well as the living members of the family, has ever been one of the tenderest and most available spots, against which tyranny and superstition could launch their arrows. Not infrequently have the dead been denied the right of sepulture and peaceful rest by the vindictiveness of kings and priests, and used as a fulcrum by which to raise *their* statue into the niche of their ambition. In no country have the buried dead been safe from unhallowed intrusion, and in no land has burial offered even common respect to the

dead; and yet if the sentiment of "rest in the grave" is worth entertaining at all, the grave should be sacred forever. It has been urged that cremation was not a necessity in this country, where there is plenty of room for burial. It is not so; there is no room, and should not be, for such plague spots of corruption as now exist. Man is a gregarious animal, and it is not right to compel him to remove his dead to a distance compatible with safety to his neighbor, at great expense, when we have the means, cheap, safe, and effectual, for the accomplishment of the object nearer home.

Certainly the means should be provided for those who may wish to make use of this method of disposing of their dead. "Man should disappear and not rot; he should no more be transformed into a mass of corruption, the source of filthy and injurious exhalations, than into a grotesque mummy, a shapeless mixture of resin and perfumes. Man should become a handful of ashes, and nothing more."

That cremation is already popular among a large and rapidly increasing class, is very evident; the public is beginning to see that it is, after all, a very rational and desirable method of disposing of the dead. Italy probably outranks any other country in the popularity of this rite and the actual number of incinerations performed. Milan and Gotha already possess the most complete facilities for the performance of the rite.

In Switzerland two or more societies already exist, and crematories are soon to be erected in Zurich and other cities. In Germany the movement is becoming very popular, and societies have been formed in Dresden, Leipsic, Vienna, and Berlin.

In Denmark, Copenhagen has a society numbering fifteen hundred members, including eighty-three distinguished physicians, and many Protestant ministers of high standing.

In London and Paris large societies have already been formed, and new crematories have recently been erected in Rome, Vavese, Pavia, Cremona, Udine, and Leghorn.

The British Medical Society, at a recent session, highly commended cremation, and recommended its general adoption. In most of the countries mentioned laws prohibiting the practice had to be repealed. In this country every one has the legal right to dispose of his body as he may see fit, so long as the ordinary proprieties of society are observed. All the opposition cremation has to encounter in this country, then, is that of individual sentiment and prejudice, and, strange as it may seem, there is not as much of this as one would naturally suppose, when we consider the deep root the custom of burial has taken from the fact of its long observation.

The American people are to a large extent practical, and when once convinced that cremation is really reverential to the dead, and removes a constantly increasing menace to the health of their families and themselves, they will not be slow to adopt it. Indeed, societies have already been formed in several of our large cities, and several crematories are soon to be erected. Even admitting that the subject is entirely one of taste, it must be a depraved taste, indeed, that would prefer to consign his body to that "narrow house that holds its tenant so long," there to moulder and decay,

and if we think of them at all, it must be in that repulsive and disgusting condition, that is only tolerated by custom. How much better to commit the body to the cleanly and beautiful flame, and have them returned to us in a short hour in the form of scentless and beautiful dust, to dispose of according to our taste and wishes. "He who hath the ashes of his friend, hath an everlasting treasure," said old Sir Thomas Brown two hundred years ago.

What a strange and holy thing death is. "We follow our friends to the dim threshold of that silent land, we feel their soft clasping hands relax, and that is all. No sound proclaims the parting of the soul, and yet in that thin moment's flash a veil has dropped between them and us." We may not lift it; but if, as some suppose, the spirits of the departed still linger near the scenes once dear to them, and have cognizance, not only of their friends, but of the bodies once made glorious by their inhabitants, which think you they would contemplate with greatest satisfaction, that loathsome mass for which, as Bossuet says, "there is no name in the human language," or the scentless ashes?

There is no such thing as rest in the grave. The moment the breath leaves the body the disgusting processes of decay begin. Who cares to lift the coffin-lid a few short hours after it is closed upon what was but yesterday the most beautiful of earth's creatures? Who does not prefer to think of the departed as they were in life? We know "the soul, the life, the all, has fled;" yet we love that cold clay, and in after days we try to remember their every word and look and gesture, and we sometimes visit that mound in the church-yard, and, struggle as we may, we cannot keep the imagination from picturing to us the dark and loathsome scene we know is going on below; and we wonder if the grave were to open now if we could recognize our dead, or if the work of decay has already destroyed all semblance, and we speculate upon the number of years that must elapse before the work of destruction is complete, and we go away with the mind full of the horrors of death, and with material for many an hour of horrible thoughts and troubled dreams. If there be one who has experienced none of this, for such an one the beautiful, cleanly fire burial offers no inducements of a sentimental nature.



## A.

### WHAT THE PEOPLE OWE TO THE STATE.

BY HON. ERASTUS BROOKS,

*New York.*

THE first duty of the state is the protection of the liberties of the people, the maintenance of law and order, of peace and power, and to secure, as far as possible, the lives and health of the whole people.

Among the first duties of the citizen is to aid, protect, support, and uphold the state,—the citizen being part and parcel of it,—in the performance of all obligations to persons, communities, institutions, organizations, and legal authorities. To this secular obligation of common duty may be added so much of that higher law which, quoting the words of Tillotson, declares that “religion obliges men to practice those virtues which conduce to the preservation of our health.”

“Daily duties paid,  
Hardly at first, at length will bring repose  
To the sad mind that studies to perform them.”

With this text for what I have to say, permit me to give the reason for the faith that is in me, trusting that I may be able to prove and practice the sentiment of one of the poets, that in real life—

“The primal duties shine aloft like stars.”

If, then, the state owes order, law, and protection to the citizen, the citizen owes to the state, in return, allegiance and self-preservation to himself and to those dependent upon him. The state provides schools for the young, hospitals for the sick, asylums for the deaf and dumb, for the blind, the idiotic, the insane; and poor houses, reformatories, jails, and prisons for the unfortunate and vicious class of people. The greater or lesser number in these several institutions and places depend upon the causes and conditions of those sent, or sentenced, to occupy them. The state performs its duty when it provides needed comfort for the absolute poor, and needed punishment for absolute criminals. All beyond this, for securing public or private good, belongs to personal and responsible administration, and this is true whether the subject relates to institutions or to families. Citizens make the family; families make the state; and states and territories compose the general government. The safe beginning will, as a rule, always make the safe end. In the state, we are not only to enjoy life, but to live nobly.

Aristotle most truly said that it is only by labor that thought can be made healthy, and only by thought that labor can be made happy, and the two

cannot be separated with impunity ; and where both are best preserved the state life and the life of the citizens will be most secure. Whoever stimulates research into questions relating to the health of the people, secures, as the first fruit of that research, a knowledge which benefits mankind. This knowledge is born of observation, and produces the experience which comes from it. One of the first lessons thus learned is, that governments best represent the people, and really only represent them, when those in power maintain what is wise and good, and provide punishment for what is dangerous and vicious.

The state, in this sense, is a civil power, a political power, a governing power of the many by the few, — the many consenting to this form of government, which means the body politic, united and organized to establish and maintain the rights, interests, and welfare of the people. In a limited sense such a government is a district, a town, a county, and these grow into a commonwealth. In a larger sense, it is a league, a confederation, and that form of federal power which most of us now call and respect as a nation. This is the imperial power of the body politic, united for all the purposes set forth in our constitutional form of government, and from which, short of revolution, there can be no dismemberment.

The first duty is the safety of the republic ; and the second, and like unto it, is the promotion of the six great precepts set forth in the preamble to the constitution ; and inasmuch as the public health is necessary to all domestic tranquillity, to all that belongs to the general welfare, and I may add to justice, in the proper presentation of what is due to the people from the state, I present this branch of what relates to popular government and duty as of the highest importance to the country and to mankind. Therefore, let the public school-room, academy, college, and university, impart what is due to the state in return for what the state has done for them, and is always doing for its children.

There should be everywhere sanitary inspections of schools, and of all public institutions, by competent local boards of health. Among the discoveries which may be made, — and I am speaking both from the school of observation and experience, — is the cause and effect of those terrible diseases known as diphtheria and scarlet fever, and of all the emanations from malarial poison. Inspectors, teachers, and parents, to arrest diseases like these, owe some service to the state.

I need not in this presence say just what this duty is, but for many persons not here, I may state that among these duties are : non-communication, isolation, safety from exposure to draughts and colds, the strict avoidance of impure water, the disinfection, when required, of clothing, of rooms, workshops, dwellings, and of all exposed places ; the special personal cleanliness of all who suffer, and of all in attendance as nurses or otherwise. Where fire and heat are not applied to get rid of what is offensive, fumes of sulphur, copperas, and other effective disinfectants must be used ; and when death comes there must be no public or family funeral. "The dead," if need be, "must bury their dead." To save the lives of the living by such means shows no want of sympathy for the dead, or for the living, but just

the contrary. One bad case of diphtheria neglected in the school-room, the sick room, or in the dead room, may lead the way to a hundred graves. The true parent, the wise friend, the honest citizen, will see that these exposures, so often caused by ignorance or false sympathy, are prevented by the strictest non-intercourse.

New York City saw 8,372 young lives lost by diphtheria alone, in the six years from 1874 to 1880; Brooklyn nearly as many or more, or 6,904, in the same time, and England over 1,000 in one year as far back as the year 1859. This disease is common and increasing all over our country, and in nearly all parts of the world.

What is true of diphtheria is measurably true of scarlet fever. This may not be so much of a filth disease, but it is communicated to children in the schools, and is therefore to be watched. Measles, whooping-cough, and chicken-pox, are also diseases peculiar to children; and to check them, when and where they exist, or are threatened, is one of the constant duties of adults. We know, fortunately, how to arrest the spread of small-pox and the consequences of neglect.<sup>1</sup>

Not only is vaccination the first remedy, but the first duty, and, as a rule, the certain cure. During its general prevalence, the closing of churches, of colleges, and of all schools, and of all public institutions, should be secured; and, if necessary, this should be the rule, if required, with all the diseases to which children are exposed.

#### SUBJECTS TO BE LEARNED WITHOUT DIRECTION FROM THE STATE.

In infancy and early childhood nature provides the most wholesome food; and the best care-taker, — including mother and nurse, — is the person who studies common-sense rules as to food, raiment, warmth, and ventilation. I have seen nearly ninety per cent. of children, under two years of age, die in public institutions, and I have seen the lives of children of the same age, and the same dependence and condition, where only eight per cent. of the whole number have died, in the country nursery and hospital, and not over fourteen per cent. in the crowded street and city. In both town and country the good and bad results came from good or bad administration; and the good, as a rule, has been, and always will be, chiefly directed by voluntary service. Nearly as many persons die from being over-fed as under-fed; and the waste of life and the want of health, in cases like these, — which may be counted by thousands, — is born of ignorance and indifference, for which the state is rarely responsible.

Mental training is another duty of parents and of teachers, and one hardly second in importance for the avoidance of dangers and unwise mental impressions. The brain, next to the stomach, is to be properly cared for, to free children from diseases known as fear, fright, hysteria, St. Vitus dance, and kindred diseases caused, or suggested, by unwisely directed advisors or educators. Let not wisdom linger where knowledge comes, — always remembering, for young and old, that where there is cure by prevention there need be no cure by medicine.

<sup>1</sup> Recently in a single ward in Chicago, where more than thirteen hundred persons were attacked, forty per cent. of the number died.



What are called domestic pestilences, such as scarlet-fever, diphtheria, measles, whooping-cough, and even small-pox, are largely preventable diseases; and the remedy is, first of all, personal care, and, secondly, the proper use of what belongs to the atmosphere of the locality. To know yourself, should in all cases mean to know how to take care of yourself, and this in the form of individual sanitation. As vaccination is the preventive of small-pox, the reasonable logic is, that every man, woman, and child should be vaccinated. Diphtheria, with all its mysteries, is shown to be the result of local conditions, whether propagated, as stated by Prof. Horatio C. Wood, by a microscopic plant or fungi from which no one is exempt, and which exists in the mouths or throats of all of us, but with no power of reproduction until it receives fresh vitality from the disordered conditions of the mucous membrane attending sore throats produced by colds. It is a blood poison in the very sources of human blood, and even in the spleen and bone marrow. The poisoned plant extends to the blood when diphtheria sets in, and the disease goes out spreading through all possible surroundings. It is declared to be possible, if existing theories hold good, to kill this human monster by artificial vaccination, and it is at least more than possible that this terrible disease may be modified if not removed. But, as it now is, even the convalescent may communicate the worst infection, and hence the necessity for domestic purification and personal care.

We read daily how and where impure water has produced, perhaps it should be said, aggravated diphtheria and scarlet fever.

In Memphis we have recently seen the most striking examples of wise and unwise administrations of the people. The change for the better only came after immense losses, suffering, and distress; but, after it came, it inspired more than a hundred towns in the country to follow one good example.

For convenience, at one time ten and three quarters miles of wooden block pavements were built in a single year, and the effect of the great wear and tear upon streets constantly broken for repairs and fixtures, produced by the constant attrition and decay, with the constant wetting of storm water, produced a fearful amount of disease. The first cause was a popular mistake in the display of a most unwise zeal in the wrong direction. The wrong done increased the mortality to a small population, or from twenty-nine or thirty in each thousand, to one hundred and forty-four colored people and ninety-two whites. Proper sewerage or drainage, pure water, the closing up of cess-pools and vaults, restored the ordinary mortality, and the cleansing of the city reduced the death rate two thirds. In 1879 the population was reduced to less than five thousand whites, and in all to little less than one half, with a corresponding reduction in the value of every kind of property. In 1879, of 7,202 buildings in the city, 1,453 had no air-space from the ground. Half of the buildings with basements and cellars had no proper ventilation; of 4,744 wells and cisterns, 3,408 were near privy vaults, and in six thousand of these apartments not two thousand were properly placed or built. And just here, and all through the country, may we find the worst enemies of health and of life.

The National Board of Health, by proper remedies, — aided in their good work by the best people, — reduced the death rate twenty per cent. in a single year. By a like sanitation the lives and health of very many of the people of Charleston, Mobile, Galveston, and Jackson were saved.

The economy of a work like this means, in time, money and work, millions upon millions saved in property, to say nothing of the saving of life and health. Of the deaths in Memphis fifteen per cent. were traced to undrained soil and to deficient sub-ventilation in the homes of the people, while fifty-seven per cent. of the total evil came from external causes, and most of all these cases were preventable by care.

#### PREVENTABLE DISEASES.

First of all under this head is the scourge known as yellow fever, which, as nearly if not all the papers before this body prove, may be greatly modified by sanitation. Then comes small-pox and ship fever, both under easy control, and then follow all those plagues of human existence known as typhoid, enteric, and scarlet fevers, malaria, diphtheria (caused by negligence), and meningitis and measles.

In clean ships there need be neither yellow fever nor cholera.

The death rate in India, by the use of sanitary means to prevent the scourge of cholera alone, was once reduced from 22.41 to 3.29, and later to 1.26. Proper sanitation has reduced the death rate six per cent. in Liverpool, three per cent. in Manchester, and in London from one thousand one hundred in one million to four hundred. Sanitation in London has also reduced the death rate from 43.5 in 1685, to less than half this rate in 1880.

#### FACTS FOR PERSONAL KNOWLEDGE.

First, carefully studied records show that typhus fever is due to a specific poison, often producing disease which is conveyed into the human body through the agencies of bad food and polluted air, and especially, in many places, by bad well-water coming from cess-pools and like exposures. Sewer digging is another serious source of evil.

Second. Scarlet fever and scarlatina may be diminished, if not stamped out, by proper exclusions and restrictions in schools, in families, and among large bodies of people collected together. Not alone the personal presence, but even clothing not used for a year has produced this disease.

Third. Diphtheria once started increases in proportion to the neglect of sanitary conditions. Decayed vegetables, all perishable fruits and products, if neglected, mean disease; and especially is this apparent where the soil is moist, as near swamps, marshes, and immovable bodies of water. Eighty per cent. of the worst cases found at Lynn, Mass., during the worst year of the disease, were in that locality. The fact of communicating diseases to persons, families, schools, and neighborhoods from such causes is beyond dispute. Even the kissing of a friend, or the breath of a friend, may communicate diphtheria. The soil also needs watching wherever this and kindred diseases are found. Malaria is always most prevalent near the surface.

On the marshy district of an infected town on Lake Michigan filth has been traced through the ground over one hundred feet. Where it is the least visible, it is often the most penetrable. All malaria and intermittent fever revels in extreme moisture.

But far more important than what is tangible and traceable are the characters and habits of the people themselves. Children are the first victims; and children can communicate diphtheria to strong mothers and stout fathers. Sometimes this disease comes from natural conditions, but most frequently from positive filth. Surfaces of mud are a part of this filth, and even the sun and air may stimulate it.

Though this disease is comparatively new in name, it was christened at Tours, in France, in 1818, and is even described by Hippocrates. The new fact seems to be its propagation in the form of a microscopic plant.

Fourth. Water used for drinking especially needs watching, and an analysis, where there is doubt or ignorance of its source or supply, is required. The transmission from wells, brooks, and springs to dwellings, also need watching. Even ice, with the purest surface, may be contaminated where the water is not pure. Polluted waters are rarely detected by touch, taste, or smell; and only chemical and microscopic examinations can trace the real source of evil. Surface wells are dangerous, and sub-soil wells are undesirable. Rain water is best of all for purity.

Fifth. Sewer gas is another public enemy. Sulphuretted hydrogen and ammonium sulphide are found in our sewers, creating organic fetid vapors; and these, if not wholly decomposed, make them fatally foul. Even one part of these gases to two hundred and fifty of pure water in the common atmosphere, it is said, will kill a horse, and double the quantity a dog, and only six parts, small birds. The schoolmaster who teaches whole pages of grammar, or books of arithmetic and the higher mathematics, chapters of logic and volumes of history and literature, should be requested to teach more of chemistry and physiology, of anatomy and hygiene, and even the principles of life insurance may be taught wisely and timely. Correct speaking, calculation, reading and writing, are well; but some knowledge of hygiene, of the structure of the human body, of the stomach and the brain, of the natural causes of diseases, if not their remedies, are at least of equal value. The common schools and academies teach practically little or nothing of these subjects, and even the colleges and universities but very little.

Men of all professions may become public benefactors, as from the desk and the forum they from time to time become instructors of that kind of cleanliness which is practical godliness, alike on the person, in the household, and on the water and on the land.

One other source of health, depending more upon the people than the state, may be traced to tenant homes, — homes such as have recently been partially begun in New York (where there are upwards of twenty-two thousand tenement houses), in Brooklyn, and more extensively in England, as described last month by Sir Sidney Waterlow, M. P., in New York, a philanthropist who has given many years to tenant reform. In 1854 he sought to secure, in the humbler homes of the people, immunity from disease, by



inspection, and safety from fire ; and the effect of this little more than individual effort, was to reduce the average death-rate from forty to eighteen in each thousand persons, and the rate of insurance, on properly-built tenant dwellings, to seven cents on each \$100, with a small rental for each comfortable room during the time of occupation.

The homes of the people are the real sources of happiness, and what is best for health should be established and recognized there, and in properly constructed and regulated workshops, school-rooms, and churches. In the latter physiology and physics may at times enter into that divine philosophy which teaches the ways of God to man ; and in the very front rank of this intelligence should be the duty and wisdom of creating, establishing, and maintaining the health of the people.

The work of Florence Nightingale in England and the Crimea, in peace and in war, in the hospital and in the camp, shows what one woman can do to save life and relieve suffering. In a like spirit, in a different field of labor, but inspired by the same divine thought, Octavia Hill, in London, possessed for long periods of time various pieces of tenement property, each one wretched in itself, and worse in the character of its inmates ; and, as a lessee, visitor, and friend, cleansed and repaired, made habitable and comfortable, all these hitherto miserable dwellings. In the same spirit a committee of benevolent ladies, to the great saving of health and life, have in charge as many as possible of the more than twenty-two thousand tenement houses in the city of New York.

This kind of service, much of which, and the best of which, is voluntary, has *proved one of the grandest physicians of the land*. At times it is seen in the direct cure of maladies, at times in the general diffusion of knowledge, and at times imparting personal comforts and positive civilization in the worst habitations of the land.

I read of the lives of ten thousand children saved in a short time in England, simply by the agencies of proper care in the use of the gifts of God to man. These agencies have been the medicine of nature, prescribed by a little practical wisdom. I read also in thirteen towns of England of a decrease of more than seventeen per cent. in the death-rates from proper sewerage alone ; but there, as here, there remains immense room for improvement. In a country like Belgium the average lives of the cleanly and thrifty are fifty years ; and of the filthy and negligent, the average length of life is only thirty-two years ; and Belgium in this respect is not a peculiar country.

All of us, my friends, have many and inalienable rights, but the right of moral, physical, and material contaminations of the city, the town, the country, the manufactory, the workshop, and of the dwellings of the people, are not among these rights. The state may repress nuisances, may maintain public, and, as far as possible, private health ; and all good citizens will not only obey the law, but, as far as possible, also present in their own lives and living a good example of loyalty for the many who are naturally disobedient.

The wise citizen will not only check disease in himself, but as far as he

is intelligent, avoid the necessity of calling upon a physician to cure preventable diseases. Still less should the state be called upon to perform any kind of work which belongs to the citizen.

I leave it to experts, and to the doctors, to be specific as to the origin, character, and extent and definition of diseases. As a layman, I see and comprehend the effect they have upon organized communities, peoples, and large bodies of individuals. I know what foul air, impure water, and bad food mean ; and I would, if I could, remove them from all conditions of household and animal life. Yes ; and I would, if I could, remove them from the face of the earth. I try to distinguish between the normal decay common to human existence, and the decay which comes from disease.

The study of chemical combinations, of biological conditions, and of epidemical relations, as a layman I may not understand ; but every one can comprehend what an epidemic is, — when in the midst of it, — and if he can trace it to foul water, to exposed cesspools, and other tangible offenses, the way is pointed out to remove the cause and to remove the effect of the evil. The sick animal and the sick plant, and whatever causes or enters into the decay of man, must be cured, or the natural consequences follow. It is enough to know that the presence and spread of filth means the presence and spread of disease. There may be other causes of sickness, but this one is self-evident, tangible, and remedial, which may not be the fact with the class of diseases caused by air and climate and the atmosphere alone, or by diseases which only skill and study can detect and cure. In the country a belt of trees and a sheet of water, absorbing disease, have often arrested its progress.

The art of prevention in disease, as in other relations, is, therefore, the best lesson for the teacher and the student. As the proverb says, "An ounce of prevention is better than a pound of cure." Even with the brute creation, as in the marshes near Rome, are shown by experiment, symptoms of malaria produced by infection of the soil and air. These lessons are of more importance in crowded communities, and in certain climates, than in the rural districts, or where the air and atmosphere, as by the sea and on the mountains, are of the greatest purity. Every day's record from the large cities teaches us that when there is most life there is most death, even apart from great numbers of people ; and much more care, therefore, is necessary to preserve life where the largest number of people are found.

It was the careful statement of your presiding officer, President Billings, last year, at New Orleans, that one hundred thousand lives were lost each year from pure neglect, and two hundred thousand cases of prolonged sickness are added during the same year. In reality, the dead and the sick, who might be saved, are far beyond these figures. I will not repeat my estimates of last year as to the money and business value of each of these lives ; but the loss and cost and value of each one presents a fact beyond dispute. The greatest loss is during the age of childhood ; but neglect, ignorance, and vice spare neither age, condition, nor sex in any of the years of our lives. Of the young it was truly said by Irwin Greenhow, in a report to a General Board of Health, that the death-rates were among the most impor-

tant studies in sanitary science, because, first of all, they give a very sensitive test of sanitary circumstances ; and, secondly, the places where they are most apt to die, are necessarily the places where survivors are most sickly, and where, if they survive, they beget a sicklier brood than themselves ; even less capable of labor and less susceptible of education. A high local mortality of youth must almost necessarily denote a high local prevalence of those causes which determine a degeneration of race.

Dr. West also says the frail child never passes completely into womanhood, but fades and droops in the transition stage through which she has not the strength to pass ; and this is the sad record of advancing years. We know from sad experience how, in the state, pauperism may be perpetuated in the double form of immorality and disease.

Dr. Jarvis, of Massachusetts, in his article on "The Political Economy of Health," says that in the seven years from 1865 to 1871, 72,727 died in their working period. In the fullness of health and completeness of life they would have had opportunity of laboring for themselves, their families, and the public 3,006,350 years ; but the total of their labors amounted to only 1,681,125 years, leaving a loss of 1,925,224 years by their premature deaths. This was an annual loss of 276,461 years of service and coöperation. Thus it appears that in Massachusetts, one of the most favored States of the country and of the world, those who died within seven years had contributed to the public support less than one half, or 46.07 per cent., of what is done in the best conditions of life. He also adds, confirming what I have already said, that it is estimated by English observations and calculations, — no notice is taken of sickness for less than a week, — that for every death there are two persons constantly sick ; and that means 730 days' sickness and disability for every death.

In 1870, in Massachusetts, amongst the people of the working age, there were 24,554 years and eight months sickness or disability, or just so much loss of labor.

In contrast to this sad record let me say that upon the whole the health service of the country, and of the world, is certainly improving ; but while this is true, it is necessary to add that, as an entire people, we are only in the beginning of the required work of real civilization. The death-rate in the United States army from all causes is but nine per thousand of white men and twenty per thousand of colored troops.

The last annual report of Surgeon-general Barnes shows that among the white troops the total number of cases of all kinds reported on the sick list was 37,408, being at the rate of 1,768 per thousand of mean strength. Among the colored troops the total number reported was 4,650, or 1,984 per thousand of mean strength. The total number of deaths from all causes among the white troops was 197, or nine per thousand of mean strength ; and the total deaths of colored soldiers from all causes was forty-eight, or twenty per thousand.

In my own State I record with satisfaction that since the establishment of the State Board of Health as many as fifty, and at one time sixty local boards have been organized in a single month. They now exist in the



twenty-four cities, three hundred villages, and in half the towns of the State. The cause of this improvement is due to the fact that physicians in many of the counties of the State, supported by boards of supervisors, village trustees, county, town, and district clerks, and indeed by nearly all county officers, have been requested to coöperate with the State Board of Health in calling attention to and in maintaining public health at home ; and to this end they were asked to respond to any and every call looking to private work, and to public meetings for the consideration and discussion of measures relating to drainage, sewerage, and general cleanliness, to the ventilation of schools and public institutions, to the supplies of pure water, to the proximity of wells to cesspools and water-closets, to the adulteration of food and drugs, as affecting health, and to all general work which seeks to secure the health of the people. Work at home, as the best missionary field of labor, is the first improvement needed. The best work always begins there.

When, many years ago, Lord Palmerston met his Scotch petitioners, asking for a day of fasting and prayer, he gave them the wise but rather startling answer : "Go home and see that your towns and cities are freed from those causes and sources of contagion which, if allowed to remain, will breed pestilence and be fruitful in death, in spite of all prayers of a united but inactive people." And Ruskin, at a later day, declared that "any interference which tends to reform and protect the health of the masses is viewed by them as unwarranted interference with their vested right to inevitable disease and death." Yet this amiable cynic induced Octavia Hill to invest ten thousand pounds sterling of his money in the lowest quarter of the city, where she might witness the transforming power of her work in sanitary reform. And so this noble woman, aided by Ruskin's magnificent donation of money, proved that wealth is health, and that health means the happiness of the people.

In this spirit Ralph Waldo Emerson, many years ago, in his words on "One in Robust Health," said, in a spirit which I have endeavored to inculcate, "The first wealth is health. Sickness is poor-spirited. It must husband its resources to live. But health answers its own ends, and has to spare : runs over and inundates the neighborhoods and creeks of other men's necessities."

Let me prescribe one other rule of business, and for domestic and public duty : Banish from your dwellings all possibilities of contamination from effete matter, all noxious and miasmatic gases from fecal decompositions resulting from soil and sewer pipes. Obstructed pipes send back into your closets, sinks, and basins the foulest odors ; and only the freest flow of water can keep them clear and clean. If the sources are all pure, and the road straight and clear, there is a way of escape. The head of every house and building should be practically a health inspector. Open the doors and windows of your dormitories and school-rooms, that the air of heaven may enter therein. A little care will shut out filth and darkness, and make room for the light of heaven and the vigor of health. One marked feature of our American life is the disease known as fret and worry. The haste and

zeal of the times causes what is called "American nervousness," which means mental and physical derangement, and which in turn again means what has been characterized as hypnotism, hysteria, catalepsy, somnambulism, and other preternatural and abnormal manifestations and hallucinations, as seen in part in Guiteau's villainous purpose, whatever the measure of his alleged insanity, for killing President Garfield. Some of these evils are born of deceit, passion, vanity, and imposture. Others are born of intemperate lives and habits and education, and produce insomnia, dyspepsia, irritability, and a long train of nervous diseases or disorders, characteristic of the times and the people. These are the diseases which lead the way to asylums for the idiotic and the insane, where it is so hard to —

"Minister to the mind diseased ;  
Pluck from the memory a rooted sorrow :  
Raze out the written troubles of the brain ;  
And with some sweet oblivious antidote  
Cleanse the stuff'd bosom of that perilous stuff  
Which weighs upon the heart."

The only offset to this amount of fret and worry is a corresponding reduction of inflammatory diseases ; and this, it is said, is almost, if not quite in proportion to the growth of nervous irritability ; and also a corresponding increase of longevity, where, as one reads, diseases of the many have been most apparent.

But leaving all these specific references to life and death, disease and cure, let me return and close with a single reference as to the duty of the citizen and the obligations of the State, condensing both in the words of another : "Duty is a moral obligation imposed from within ; obligation is a duty imposed from without. Duty implies a previous obligation ; and an obligation involves a duty. . . . My obligation is to give another man his right ; my duty is to do what is right. Hence, duty is a wider term than obligation."

"Duty and right are relative terms. If it be the duty of one party to do some thing, it is the right of some other party to expect or exact the doing of it."

## B.

### HEALTH, THE TRUE NOBILITY.

By ALBERT L. GIHON, A. M., M. D.,

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WHICH is the fairest of babes, what man the manliest, who among women the queenliest woman?

Is it the infant ushered into the world amid a nation's plaudits, cradled in damask and surrounded by all the luxury of wealth, whose dull eye and feeble wail betoken its dire inheritance from generations of royal sinners; or the rosy child, without spot or blemish, feeding at a mother's breast which has never ached with pain?

Is it the man who daily wakes from restless slumber to battle with one or another of the body's ills, which have pursued him from birth or are the fruits of his own reckless living; or he whose sound body domiciles a sound mind, and whose nerves thrill with ecstatic pleasure to the harmonious tunings of his senses?

Is it she whose existence has been one long plaint of suffering, who hides ill-shaped, attenuated limbs and shrunken bosom beneath rich garments, and by cunning artifices makes that seem which is not, braiding her thin, short hair with other women's tresses, tinting her sallow cheeks, and filling unsightly gaps until they counterfeit nature's rounded outlines; or she whose warm blood courses unchecked throughout her faultless form, mantling her cheeks with rosy hue, moistening her lips with dewy softness, and brightening her eye with lustrous fire, whom time fails to disfigure, and who passes out of the loveliness of youth into the eternal beauty of perfect womanhood?

What is it thus beautifies the babe, ennobles the man, and glorifies the woman, which no wealth can purchase, no ancient lineage nor exalted station secure? Health. Health is the priceless talisman of beauty. Health is the patent of nature's own nobility. Health is the crowning glory of womanhood, and of all humanity, the source of all earthly happiness, the mainspring of every human pleasure.

The Greeks deified health, typifying it, like every other good and blessing known to man, in the guise of woman. She was legendized as the daughter of Æsculapius, the god of medicine, and was worshipped with him. She sat by the side of Apollo, the type of manly vigor, and herself, the impersonation of female loveliness, was the companion of Pallas, the goddess of wisdom, and of Cytherea, queen of love. Among the sisterhood of deities none was more fair and honored than the divine Hygeia. Young and old crowded her temples, rejoicing that through her favor the world



was so bright and joyous, and life such sweet lingering on earth. Alas! how has she fared in modern times? Her statues have fallen from their pedestals, her beautiful temples have crumbled into ruins, her faith discarded and her precepts scorned. A few votaries of the sweet goddess have preserved the secrets of her cult, and with encouraging success have sought to reëstablish her fanes and light once more the sacred fire upon her altars.

Foremost among the new propaganda of this old faith is the American Public Health Association. The seven gentlemen who assembled in the rooms of the New York Board of Health on the 18th April, 1872, have good reason to be satisfied with their preaching of the gospel of health. At Long Branch, at Cincinnati, at New York, at Philadelphia, at Baltimore, at Boston, at Chicago, at Richmond, at Nashville, and at New Orleans, they and their zealous coadjutors found multitudes of willing converts, as it is hoped they will this year succeed in doing at Savannah.

Are the rites this deity's service imposes solemn hyperdulia, recondite mysteries, only to be mastered by a trained priesthood? Far from it. Health is nature's simplest faith. Its liturgy can be written in the prattle of children and the commonplaces of the peasant. Its laws are fixed, irrevocable, eternal. This do, and thou shalt live and be happy; do that, and thou shalt surely suffer and die.

If health is but the outcome of self-evident truth; if long life, unalloyed happiness, ecstatic pleasure, are but the recompenses for simply walking in its broad paths, and premature decay, pain and sorrow, and ungratified desire the certain penalties for wandering in the tangled by-ways that stretch far away from it in unknown lines, why should any need be taught that wherein their interest lies? This is the great mystery of humanity. Why, having ears they hear not, and eyes they see not. In every age men have rushed where angels have not sought to tread. While the sanitarian begins his teaching, abashed at the simplicity of the lessons he has to inculcate, knowing, on the other hand, the stubborn incredulity of the world, he realizes the magnitude of his undertaking.

A perverted religious sentiment is responsible for this disregard of the body's welfare. A system which teaches that the physical man is the enemy of an independent, immaterial personality, called soul or spirit, that the flesh is inherently rotten, vile, and sinful, that the more beautiful its contour, the more sensitive and delicate its organization, the more surely it leads its psychic prisoner towards the gates of hell and eternal damnation, had but one corollary, that it were good to despise, degrade, and mortify this earthly thing, which is all we know as self — which we call father, mother, brother, sister, child. Naturally these earnest strivers after spiritual salvation immured this carnal foe, of which they could not rid themselves and live, in convents, monasteries, and hermit cells, and passed their lives in a long crusade against the pleadings of their senses. They welcomed pain, the protest of outraged nerves; they endured hunger, the cry of the thin blood for food; they suffered cold, because it antagonized every sense of pleasure; they wallowed in filth, in defiance of their educated hu-

manity. The modern Christian, like the older Boodhist, waxed in self-complacent holiness as he tortured, deformed and degraded his body, preparing the way for fiendish inquisitors, who, in the name of God and Saviour, tore off the sin cased flesh of gentle maidens with red-hot pincers, and sought to appease the vengeance of a Heavenly Father by impaling unbelieving babes. Rather the pagan's homage to that Maker, in whose image he has been fashioned, by glorifying that masterpiece of creative power, the human body — that marvelous mechanism called man. What mortal handiwork can rival this, in the mysterious intricacy of its parts? What other object on earth or in the heavens approaches in beauty that culmination of grace and loveliness — the female form? Grant the soul a distinct identity, can it have a grander temple than this house not made by hands, and should not this be guarded from pollution with jealous care, its avenues closed to every unclean thing, the slimy reptile of disease allowed no hiding corner in its secret chamber, the sacred fire of health kept burning on its altars, daily decked with fresh thank-offerings.<sup>1</sup>

It is only my present purpose to ask your attention to the culpable neglect which has been the natural consequence of the degradation of the body, and to urge upon you, in the interest of every living being, in the interest of every organized community, in the interest of the whole human race, the importance of bestowing the most earnest thought upon the subject of physical culture. All that we know or feel, every desire and gratification, find expression through the body. Thought, will, emotion, sensation depend upon the normal action of normally constituted organic molecules. Hence, to think intelligently, to feel acutely, the chords on which these harmonies are rung must be in perfect tune. The aggregate actions of the various organs and apparatus of the body, which we call life, if harmonious and without jar, are what we mean by health. Dim the eye, deaden the ear, silence the speech, and benumb the touch, and what will remain to us of the bright world? Widen the avenues to the senses, let in the flood of light and sound, develop the capabilities of the physical man, and as he communes with new spheres, he grows in mental stature.

It behooves us, therefore, to cultivate this garden of the soul, in which it lives and thrives, to develop this mortal frame to its utmost, that all those attributes of manhood, which are alone possible through its instrumentality, may be exercised in their highest intensity, not only for the well-being and happiness of the individual, but for the welfare and higher development of the whole race. Rich estates and noble titles are valueless bequests beside the heritage of health. The youth who can boast an ancestry free from the stain of transmitted disease, has a prouder blazon on his banners than the lordling whose feeble frame bears the indelible mark of constitutional contamination. Invalid parents beget invalid offspring, and these other weaklings like themselves, whose puny descendants ramify over an entire country. How great, then, should be the concern of the community in the physical condition of its individual members! The

<sup>1</sup> "Our bodies are God's temples, and the joy and the terror of life depends on our keeping these temples pure or defiling them." — *Is Life Worth Living*. — MALLOCK.

contaminated man, seared through folly, ignorance, or sin, does not bear his living burden alone to the grave, but shares it with his wife and child. It leaps the threshold of his home. The blight spreads from household to family, to vicinage, to race. The muddy stream poured into the ocean, meets others from like polluted sources, each aiding the other in marring the purity of the broad waters. The physical deterioration evidenced in certain localities, notably in America, by the paucity of children, the abstention from outdoor life, the incapacity for athletic sports, and the high mortality rate, is only temporarily retarded by foreign importation. While the breeding of cattle is carefully fostered, and splendid results obtained by judicious crossing, the human animal is allowed to intermingle without regard to possible funest consequences. The mother confides her spotless daughter to a contaminated husband, the father sees his son deliberately taking to wife the heiress of some other father's infirmity. The warning family records of premature decay are unheeded. Hereditary taints are blindly encountered and physical vices intensified and perpetuated in malformed and weakly offspring. Nor is the evil wrought limited to the impairment of the body. Crime is the outcome of physical defects. The brutal outrages which have disgraced humanity have been the fruit of impulses ingrained in ill-developed brains, exaggerated by repeated crossing. If the intermarriage of criminal classes is beyond the control of society and the vipers must breed for slaughter, the enlightened sentiment of the educated should, without the need of arbitrary enactments, restrain the chance, promiscuous sexual alliance of the doomed victims of disease. Why should the future of a family or a race be imperiled to gratify the impulsive whim, the momentary fancy, or even the ardent affection, of these who bear the stigma of an ineradicable physical taint? Men toil and hoard. In the eager greed of wealth they sacrifice health and strength, and, prematurely old, survey the pile of gold which is to purchase pleasures they no longer have the capacity to enjoy. The very effort to taste the unaccustomed draught kills them before they should have reached their prime, and dying, they leave their riches to children framed in the likeness of their own decrepit bodies.

What if the sanitarian succeeds in inducing mankind to heed his warnings! Will not life be made up of self-denials? Will we not have to live and move, eat, sleep, and dress by rigid rules, so irksome that one would welcome the pangs of pain as penalty for untrammelled pleasure? By no means. It is not a question of a short life and a merry one, without restraint, in contrast with the tedious drawling of years of cheerless asceticism. The song and dance, the music and the flowers, the joyous laugh and sounds of jovial frolicking are heard and seen among Hygeia's followers; the cry of pain, the wailing of the sorrow-stricken, tears, agony, despair, the gloom of death among those who have denied her. Let the child learn the simple laws of health and the man will live responsive to them as automatically as the musician obeys the laws of harmony. Inculcate on the youth that his ambition should be the possession of a healthy physique; on the maiden that no art can rival the charms with which nature



will deck her unblemished form ; that however lowly the station or humble the home, he and she may proudly vie with the cions of the archest aristocracy in that vigor of body, that strength of mind, that exquisite refinement of the emotional nature, which constitute the perfect thinking, feeling, loving, living man and woman ; that the blue blood, which is derived from titled progenitors, however many their quarterings, is cold and sluggish in the veins beside the red blood which has been transmitted from ancestors who have known no stain of disease.

What are these simple laws of health ? The first and greatest, and that which comprehends all others, is Hygeia's mandate to be *clean*. It is not an idle saying that cleanliness is next to godliness. It is its nearest kin, as filth is the parent of disease and sinfulness. Let us see what it means to be clean, and first realize that one half <sup>1</sup> the mortality of the very centres of civilization, — the great cities of the world, — wherein are gathered the wise and learned, is due to preventable disease ; one half the deaths that are at this moment being mourned throughout the land need not, ought not, would not have happened had this law of cleanliness been obeyed, for preventable diseases are expressively, if coarsely, named *filth diseases*, and filth is all that which defiles, not merely the outward surface, the person and attire, the dwelling-place and sleeping apartment, but penetrates within, entering the body as food and drink and befouling the air, which fills the lungs, poisons the blood, permeates the tissues, and carries its nocuous influences to the minutest cell in the remotest organs. The unclean skin, the unkempt hair, the sordid garment, the bestial den and disgusting viands offend the senses of all but those whom ignorance and want have made lower than brutes ; but the foulest of all foul things, and that which is more insidiously deadly than them all, — foul air, — because unseen, is breathed by gentle lady and learned pundit without a shudder and without fear. The clean and the unclean sit side by side, the delicate woman drawing into her lungs the disease-laden emanations of some unfortunate honeycombed by disease. Could those curling clouds of noxious fumes be made visible what horror would we have of them ! An idea of it may be obtained in a public conveyance on a frosty winter's day, when the condensed vapor of the passengers' breaths may be seen circling out of one's mouth and nostrils, to be drawn into another's ; and what is there feebly illustrated takes place in every badly ventilated theatre, church, and school-house. Go upon the densely populated berth-deck of a passenger-ship or man-of-war, and what the eye cannot distinguish is soon made manifest by the other senses, by the sickening odor, the mawkish taste, which indicate the saturation of the air with the products of human waste, the poison of *ochlesis*, the poison of overcrowding, which, intensified, destroys life quickly, which in every railroad car, in every crowded vessel, in every place where human beings

<sup>1</sup> The report of Dr. John T. Nagle, Registrar of Vital Statistics, shows that during the three months ending September 30, 1881, there were 10,967 deaths in the city of New York, being equivalent to an annual death-rate of between thirty-five and thirty-six in every thousand inhabitants, the population being estimated at 1,242,533. The mortality from zymotic diseases alone amounted to 5,079, a death-rate of over sixteen individuals in every thousand from diseases for which bad ventilation and bad drainage are mainly responsible.

are congregated, here in this very hall, is present in a more or less diluted but always dangerous form. Among the myriads of travelers who are hourly being transported about this country, how seldom will one be found to scan the ventilators and other air apertures provided in our railway cars, and if one there be hardy enough to open the window beside him to feed his famished blood with fresh air, how general will be the malediction of his neighbors at his endangering their lives by draughts. Through fear of draughts every window of the confined apartment is closed, and the would-be guardian of his health deliberately poisons himself and his neighbors, befouling them with an indescribable nastiness that the stomach resents until it becomes paralyzed into insensibility, and against which the aching head makes indignant and persistent protest. Few of us would care to enter the bath which had already served a predecessor, yet the water possibly were less offensively soiled than the air of the apartment into which we plunge with reckless indifference. The nausea which assails you in the confined cabin below the water line, or in the musty, pestiferous sleeping holes of a Pullman car, disappears when you have access to the free air, as does the drowsiness which possesses you in church, and which you have ascribed to the prosy sermon. When the public can be made to realize that one half the men, women, and children who are falling dead around us have died before their time from preventable diseases, and that most of these are directly or indirectly due to impure air, they will appreciate how momentous is this problem of keeping clean the atmosphere we breathe. Yet air as deadly may be found in the sumptuous palaces of princes and millionaires. Men build costly mansions and heedlessly fit them with contrivances designed to aid that indolence of luxury which spares the flaccid muscles the slightest effort, and which, through their unsanitary construction, destroy their children and themselves. The victims of typhoid and diphtheria sleep without waking on satin cushions in rosewood coffins. Our own children go to ill-ventilated schools<sup>1</sup> by day and sleep in ill-ventilated rooms by night. The invalid teacher, fretted by the cares of her vocation, enfeebled by her sedentary life and cheerless solitude, tries to supplant her failing heat-producing power by closing windows and doors and building fires, until the crimson which the sunlight had stamped on the child's cheek fades, and she too shivers at the fresh air's touch. You, also, suffer headache from

<sup>1</sup> "The average school-child is liable to be subjected to a greater or lesser number of the following approved educational practices or incidentals of school management: A long enforcement of constrained or 'military' attitudes, and the compelling girls, in particular, to stand for protracted periods of time; the prolonged sitting at desks, whose height or relation to the seat forces the child into a cramped position; a lack of supervision over the play-grounds; crowded rooms; dusty or *impure air* and poorly regulated temperature; insufficient or improper lighting of the rooms; lack of care to prevent the increase of myopia and deafness. Few teachers understand that the 'myopic eye is always a sick eye.' Excessive studying out of school, irregularity in meals, insufficient recreation, the excitements and worry of examinations, the struggling for high marks, steady mental application without reference to changes in bodily functions or physical strength — all these unite to impair the health, and often prematurely break down the constitution of growing children. That these are not imaginary evils it is unnecessary to argue. Actual observation long ago established the facts." — *The Medical Record, New York, November 12, 1881, page 548.*

foul air, you are tired and listless from foul air, you sleep disturbed and awaken unrefreshed from foul air, ten in every thousand of you die yearly from foul air. Happier by far to sleep on a rude pallet in a garret, through whose thatched roof the stars twinkle, than on the downiest couch in the alcoved recess of a palace chamber, whose heavy hangings stifle the still air, which curtained windows have imprisoned, and fire and sewer have poisoned! Better shiver as they do in Europe around a porcelain calorifère than drowse in lethargic stupor from breathing the mephitic atmosphere of an apartment overheated by the furnaces and flues by which modern ingenuity contributes to the defilement of the air<sup>1</sup> accomplished by coal gas, illuminating gas, sewer gas, and human exhalations. The one gift of which nature has been so munificent that peasant and prince alike can boast a boundless wealth of it, the one whose purity she has so carefully provided that it can only be polluted by confining it, that of all others most essential to the healthy maintenance of the body, is fresh air. Chief food of the well, most potent of remedies for the sick.<sup>2</sup> Place the convalescent where the bright sun-warmed air can kiss her pallid cheeks, lead the careworn man from the murky recesses of his office to the sea-shore, where the fresh breeze comes skipping over the waves, send the swarms of feeble, emaciated children from the dark, damp courts and cellars of the city into the green fields, with their air perfumed by wild flowers, if you would witness the magic that can be wrought by this invisible agent. But is health only possible in the sunshine, on the sea-shore, or upon the open fields? No; the air of the city may be as pure as that of the mountain-top if it be given scope to free itself of impurities. The nursery and school-room, the chamber and the office, the court-room, the theatre, and church, can all be habitable, if human intelligence will lend itself to this one problem of

<sup>1</sup> Dr. Smith Townshend, Health Officer of the City of Washington, in his annual report submitted to the Commissioners of the District of Columbia, November, 1881, states: "In many instances in this and other cities, hot-air furnaces are located in unventilated cellars, and, having no cold-air duct from the outside, the inmates of the entire building are forced to breathe the air taken up from the cellar. The cellar is probably made a receptacle for all refuse from the rooms above, there is an accumulation of ashes and filth in the corner, an imperfectly drained surface and a defective sewer trap and sewer opening in the floor, with other insanitary conditions generating impurities, to be taken up by the ducts of the furnace and conveyed above for use as lung food by the unfortunate and unsuspecting occupants. Instances are known where the furnace has been set in a pit in the cellar (room not being given between floor and ceiling), and the trenches about this pit found filled with stagnant water, dead rats, mice, etc. Latrobes have been taken out and a hole found under the hearth whereby all air for rooms supplied was taken from a damp and entirely unventilated cellar. In the winter season, with all possible means of ingress for cold air to rooms stopped, and the hot air being supplied from such a source as described, is it a wonder that cases of typhoid and scarlet fever, diphtheria, and other diseases dependent upon impure air are developed? It is said, and very truly, too, that ventilation is wasted when directed against any avoidable pollution of the air. It is the wisest policy to see that nothing is taken into your dwelling by one channel which it may be necessary to construct another to remove."

<sup>2</sup> "Winter is the season of lung affections, the larger part of them induced by long continuance in a vitiated atmosphere. The 'breaking-up' of a pulmonary disease would often be accomplished by breaking the bedroom windows." — *Dr. Oswald in Popular Science Monthly for November.*



cleansing the air, if the masses will realize that invisible, impalpable filth is as noxious as that filth which offends the sight and touch, and infinitely more to be dreaded. Learn to shun this, and the great victory of sanitary science will have been won.<sup>1</sup>

It is almost supererogatory to do more than suggest that the law of cleanliness involves cleanliness of the body itself as of the habiliments with which it is clothed and the domicile it inhabits. One need not be a physiologist to understand what wondrous influence a clean skin has upon the harmony of the functions, how many pounds of effete material are cast off by it during the day, and how necessary that this human refuse should be removed. The dry and grimy skin is neither healthful, comfortable, nor beautiful. If the prize of health be not incentive enough, nor the sense of comfort be an inducement to frequent bathing, the clear complexion and soft, smooth velvet surface of the clean man and clean woman should induce every human being to avail himself or herself of this cheap balm of beauty. Man breathes through skin as well as lungs, and if I have succeeded in convincing you that the airy aliment with which the inner man is fed must be innocuous, I would have you not forget that the outer man cannot wallow indolently in the human waste, which the processes of life accumulate about and upon him, without falling from that high caste of physical manhood to which his superior development entitles him. Time will not permit me to enter into the details of the toilet beyond insisting that a matutinal washing of the face and hands, and an occasional ablution of the feet, are not all the care of person that health requires. The undergarments, freighted with their load of organic débris, must be changed and cleansed, and the porous surface of the body freed from the dry, hornlike coating of epithelial scales which neglect allows to form and interfere with the cutaneous exhalation. Man is preëminently the creature of habit. The child trained to be clean from birth will look upon sponge and bath and tooth-brush as indispensable, and will walk all its days on the cleanly path on which its mother first taught it to pick its footsteps. The sordid teeth

<sup>1</sup> "Early impressions are very enduring, and can make useful habits as well as evil ones a sort of second nature. In order to forestall the chief danger of in-door life, make your children love-sick after fresh air; make them associate the idea of fusty rooms with prison-life, punishment, and sickness. Open a window whenever they complain of headache or nausea; promise them a woodland excursion as a reward of exceptionally good behavior. Save your best sweetmeats for out-door festivals. By the witchery of associated ideas a boy can come to regard the lonely shade-tree as a primary requisite to the enjoyment of a good story-book. Children who have been brought up in hygienic homes not rarely 'feel as if they were going to be choked' in unventilated rooms, and I would take good care not to cure them of such salutary idiosyncrasies. Every observant teacher must have noticed the innate hardness of young boys, their unaffected indifference to wind and weather. They seem to take a delight in braving the extremes of temperature, and, by simply indulging this penchant of theirs, children can be made weather-proof to an almost unlimited degree; and in nothing else can they be more safely trusted to the guidance of their protective instincts. Weather-proof people are almost sickness proof. Even girls who have learned to brave the winter storms of our northwestern prairies, will, afterward, laugh at 'draughts' and 'raw March winds.'" — *Physical Education*, by Felix L. Oswald, M. D., *Popular Science Monthly*, November, 1881, page 55.

and fetor-tainted breath are not only disfigurements of the fairest face, but shameful evidences of maternal neglect and incapacity.

With this I might cease to claim your attention. When the lungs are hourly filled with pure air, and the clean body is bathed in its sunlit ocean, the enlivened blood will crave its proper food, and the awakened appetite may be safely trusted to select it. Food has hitherto engrossed the attention of hygienists to the exclusion of this weightier matter of fresh air. Eat what you please of the good things of this life, only be sure to eat enough. Renounce the heresy that it is wise to rise from the table with hunger unappeased, and above all, do not send the little helpless dependents on your bounty supperless to bed, to have their empty stomachs rack them into unquiet slumber. The gaunt-eyed gaze of the poor underfed shop-girl is a sadder sight than her scantily clad form, but, saddest sight of all, is the spectacle of the poverty-stricken mother spending her little stock of hard-earned pennies for drugs for the feeble child, which, like herself, needs only abundant food to be well. The discussion of dietaries is a matter of secondary importance. Accustom the child to be omnivorous. The eccentricities of the palate of later life are often the results of caprices gratified during childhood. Let the food be good and wholesome, plentiful in quantity, and not ruined by the cooking. National and sectional habits become idiocratic and are not easily eradicated. The Yankee stomach delights in pies and baked beans, while hog and hominy are in equal favor in Dixie. Banish the pie-board from the North and the frying-pan from the South, and thousands will live who now perish. The cook is a mighty power. Amid the smoke and vermin of the kitchen he wages war on the people who despise him. He sugars the venomous pill and sweetens the poisoned draught, and with disdainful contumely bids you eat, drink, and die. Dignify his calling, and expound its mysteries to the ruler of the drawing-room. Let the young mistress of the house know that culinary chemistry is as elevated a study as the physiological chemistry of her brother, and that the changes to be rung in flour and butter and sugar and milk and eggs are not mere panderings to taste, but the foundations on which are reared races of valiant men and lovely women.

The sanitarian, who has invaded the penetralia of the household, who has fought his way from kitchen to dining-room and salon, may pause before he seeks to peer beyond the curtained entrance of the dressing-room. Though he disclaim a purpose to assail the esthetics of the boudoir, and invokes the womanhood of Hygeia as his authority for pointing out wherein they have failed to obey her laws, mother and daughter, grandmother and grandchild will bar the portal against him, and in spite of the goddess's precepts and his warnings, will clothe the future woman as they were clothed, and flock around the gaudy shrine where fickle fashion holds her sway. He may unveil the ample-waisted Venus, but they will turn admiringly to the costumed model in the modiste's window. He may point to the index of the spirometer, which proves unerringly that no woman who wears a corset can fully inflate her lungs, and they will contemptuously lift the edge and ask if that be tight. He demonstrates how the loosest stays prevent the

rising of the ribs and flatten the bust, and summons the full-formed Andalusian, Moorish Jewess, and Manillian to bear him witness; he shows by diagrams how the French-heeled boot paralyzes the muscles of the leg, attenuates the calf, and deforms the foot; and argues in vain that a ring in the nose is no more barbaric than rings piercing the pink-lobed ear, and that a mountain of hair, robbed from some victim of the morgue, and piled on oval, flat, elongated heads, without regard to symmetry, is both hideous and unhealthful. The corset-maker waxes rich, and her hour-glass shaped abomination, fitly like the grim symbol of Time, the destroyer, continues to distort, deform, and destroy the beautiful outlines of nature's grandest masterpiece.

It is not my purpose to discuss the thousand sinnings against the divine Hygeia's laws, which we all commit daily. Our children, as soon as born, are thwarted in their natural instincts by grandams, and doting fathers and anxious mothers, who either starve them through fear of overfeeding or gorge them into dyspeptic surfeits. The breast that should nurture them is unfitted for its office or denied them, and stalwart boys and girls are sought to be built up of farina and its thousand starchy congeners. The little child toddles to school to have its brain prematurely stimulated by mental aliment as indigestible as the viands put into its stomach; by day cheated of its outdoor life, and burdened with nightly tasks, sits blearing its eyesight over illegible print by flickering lights. It enters upon adolescence with sallow face, bent form, round shoulders, flat chest, and thin, frail limbs. If a boy, the weakly semblance of a man learns to smoke cigars or cigarettes arresting development, obtunding his brain, and impairing his vital powers, until he is only fit to be the father of one or two puny, whining, suffering little repetitions of himself; if a girl, her shrunken chest disguised into an absurd imitation of the shape of woman, her cheeks untinted save by cosmetic art, defying the elements in midwinter in thin stockings, paper-soled shoes, and phantom underclothing, she lives in the foul, overheated atmosphere of the ball-room, spurring her feeble energies by the stimulus of excitement and beef-tea to spurts of muscular effort, or saving herself, when about to fall gasping, by rushing to the open windows, she survives by chance to become a mother, a mother unfit for maternity. If parents thus idly witness the immolation of their children, they are not more tolerant to themselves. They labor to amass riches, to attain position, to acquire power, spurning the heed health counsels, the man withering and molding under the pleasureless monotony of office routine, the woman bending and breaking beneath the servile drudgery of domestic burdens, her feminine charms and soft attractions vanishing to give place to the slattern's grime and wrinkled coarseness, they shamble along life's highway, to fall before they reach their goal, or reaching it, to find the crown and laurel mirrored on a death's head, the sceptre in skeleton hands, and the gaudy trappings shrouding a living corpse.

O men and women who listen to me, if you would not yourselves, nor have your children, meet this fate, give ear in time to the words of warning that we of this Association utter! If you would taste the sweets of this bright,



beautiful, glorious world and live happy lives, unmarred by pain and sorrow, see that the greed of gain, the ignorance of the truth, the blindness of unreasoning gratification, do not swerve you from that course of right living which can alone make you hale, hearty, vigorous, godlike men and women. Do not wait until disease stalks into your homes, and then rush to summon the physician, in the hope that he will in a day undo the evil you have wrought in years. O monstrous incredulity of this enlightened age! The learned lawyer and divine, statesman and merchant prince, are heedless of sanitary teachings, till their loved ones are stricken by the scourge they might have prevented. They, as well as their less gifted fellow-beings, hasten to swallow drugs and nostrums to relieve the bodily afflictions they have deliberately invited. Hamlet and city are ablaze with the colored lights of the apothecary's shop, whose bottle-burdened shelves find eager patrons. Public nuisances exist in the great cities under the very eyes of the magistrates. The noisome refuse of the streets lies decomposing in the sun, sending its poisonous emanations into every house. A few decrepit laborers, with brooms they can scarcely wield, brush off the surface into little heaps to be scattered by passing vehicles, and the miserable farce is unconcernedly witnessed by the intelligence of the age, — the same intelligence which commits to an ignorant mechanic the sanitary construction of a house, whose defects make it a more dangerous habitation than the widely creviced log-cabin of the frontiersman. The details of the midnight murder are carefully perused, while the health officer's solemn utterance — thirty to forty men, women, and children in every thousand have died; fifteen to twenty of these from preventable disease, fifteen to twenty murdered by ignorance that is unpardonable, by indifference that is culpable, by neglect that is criminal — falls on unlistening ears.

Is it a harsh law, 'Thou shalt be clean'? Is it an arduous duty for the parent to instruct the child that the nobility of health is that to which it should aspire; that only the cultured body can be fit residence of the sound mind; that though the garb be humble and the station obscure, the manhood of the man and the womanhood of the woman will be manifest in the bright eye, the blood-mantled cheek, the robust form, and the vigorous life shown in every movement? Every woman may not have symmetrical outlines of face and figure, but she need be marred by no sickly hue, emaciated frame, and faltering gait. Her heart should send a current of healthful blood to animate a form that knows no ailing. The center of a bright and joyous existence, she should be fit helpmeet, companion, friend, and lover, equally participating and reciprocating all the joys of sense and understanding of one who, like herself without blemish, stands proudly peer of all his fellows, — a nature's nobleman.

## C.

### THE SANITARY SIGNIFICANCE OF THE INTERNATIONAL MEDICAL CONGRESS OF 1881.

By DR. E. M. HUNT,

*Trenton, N. J.*

THE eyes of the world have been turned toward the meeting of the International Medical Congress held in August, in London, as they never have been turned toward any scientific or professional gathering in ancient or modern times.

If there is anything in the science of medicine at all, there is more in it than in any other science, because it has attached to it an art, whose end is the prolongation and preservation of human life. Hence it has to do with so much of what life means, that the world may well stand inquisitive as a deeply interested party to know what this science means, how much of it is productive of an art, and how far that art actually preserves, or is preparing still more to preserve, life or health to all peoples. It was this that gave universality to the call and elicited an international interest coextensive with the boundaries of civilization. No study and no art has been so long and so patiently in waiting for the needed aid of other sciences.

Superstition, mysticism, and the arts of the enchanter, could not but shadow forth their cloud-land around its earlier efforts. So long as the "Physis" or nature was obscure, so long obscurity had to play the *role* of knowledge. So soon as physics and biology began to assert themselves by facts and by discovery, so soon it was evident that all sciences that had to do with nature were about to put their knowledge at the physician's feet. The wonderful relations of organic and inorganic matter and of vegetable, animal, and human life soon told us that there must be analysis and classification of enormous bundles of material, and that all of it was more or less helpful in the direction of medical art. It is not wonderful that progress in physical science reached out a touchstone for every physician's hand, and that departments rapidly pressed themselves upon the attention of a host who were in the same workshop, but found themselves forced to division of labor by the immensity of the field presented. Not only has the medical world been on the alert, but other sciences have so rapidly cast light upon the arts of practice, that those in other fields have come to share in the work, as well as in the enthusiasm. The influence therefore of this Congress is of such a character as cannot be in the least ephemeral.

First of all, it may be said of it that its importance gained royal significance and patronage, which means far more than the mere formal opening by a royal prince. He had been once stricken and well-nigh destroyed by

a vagrant pestilence. The crown prince of Germany, too, had become interested in the medical profession, as already having given a scientific prominence to his own empire.

The very opening in the presence of such royalty, was a public recognition of the fact that medicine as studied and taught belongs to that great academy of science which becomes a material resource and interest and development of any great nation, and also that it has social and economical relations which penetrate amid the very fibres of national life.

It was in advance so evident that sanitary science and the art of prevention would receive a large degree of attention, that in the judgment of your worthy president and of the executive committee it seemed proper that this Association should accord recognition of its importance by accrediting some of its members to be present in a representative capacity. Accordingly your secretary, Dr. Azel Ames, Jr., and myself were invited to add to our other recognition the credentials of this Association. With regret that Dr. Ames was prevented attending, I have thought that a careful selection from the abundance of this great gathering, so far as it relates to public health, together with some reflections that occur therefrom, might not be unacceptable to this distinguished body.

First of all, the real status of sanitary science and art came to be authenticated and defined as never before. We have been wont to look upon state medicine, technically so called, as having achieved quite a success in that it has been able to enroll itself among the sections of large medical associations, and to command enough respect from here and there a medical college to be patronized by a reference.

But the indelible impression made and confirmed by the International Congress is that preventive medicine, or the art of hygiene, is not so much a section or specialty as it is the essential warp of longitudinal threads on which the great breadth of all medicine is to be woven, and by which the rich texture of the completed system is to be secured. What Hippocrates long ago called the *vis medicatrix naturæ*, by its aid has come to such a breadth and depth of meaning, as to make it not less the basis of the healing than it is of the preserving art.

It places sanitary science as the radical basis of all conservative and essential progress in treatment. It does not make all the science and study involved in medicine to include it, but it does make all application of the science to the art most inquisitive as to just how far and where there is deviation from nature; how this deviation can be corrected by a restoration of the natural relationship between man and his surroundings, and how much of that restoration nature herself will accomplish, if only the physician or surgeon directs his attention to giving to the body and to its diseases fair play for its own forces of recuperation.

Hence amid the grand progress made in the observation, assemblage, and assortment of observed facts so as to make knowledge, and amid the grand discoveries in the line of pure science, you will find hygiene coming into prominence every time amid the question as to the application of medicine as an art.



One did not need to wait for the opening section of the great Nestor of this department, in order to ascertain what is the province of practical hygiene in the profession of medicine, as well as for the state or nation.

The Prince of Wales, in his most befitting address declaring the Congress open, said: "I am very happy to see that so great a scope will be granted to the discussion of the important questions relating to public health, — to the cure of the sick in hospitals, in the houses of the poor, and to the welfare of armies and navies. The devotion with which the members of the medical profession are ready to share in the dangers of climate, the fatigues of war, etc., to study every means not only for the remedying but for the prevention of disease, deserves the warmest acknowledgment from the public."

When Sir James Paget, as president of the Congress, would illustrate how apparently trivial inquiries had become vital and essential, he derives his illustration from the researches of a few naturalists as to the vibrionidæ. "These researches," said he, "have given a more true form to one of the most important practical doctrines of organic chemistry; they have introduced a great beneficial change in the most practical part of surgery; they are leading to one as great in the practice of medicine, . . . and their power is not yet exhausted."

Professor Virchow, in his address before the Congress, speaking for the field of pathological experimentation, shows that hygiene calls for "tests of the various causes, cold and warmth, dryness and moisture, dust and noxious gases, micrococci and bacteria," which help to produce disease; and also says: "The proof of the great importance of hygiene and prophylaxis is rather superfluous. If any class of men have been active in this direction it is surely medical men. Never has there been a want of zealous hygienists among them, and when a great problem of prophylaxis was to be solved, one might be sure of finding medical men engaged in the work. We are so accustomed to this obligation that we always regard hygiene and prophylaxis as belonging to medicine, and to no other science."

He could at least say this fully of himself, for although known as a pathologist, he has been all along a sanitarian.

The collection of treatises connected with state medicine and epidemiology<sup>1</sup> contains various papers by him on epidemics, mortality statistics, school hygiene, and sanitary care of cities, while, as alderman of Berlin and representative of the city in the lower house, he wrote and spoke much on sanitary legislation.

The general address before the Congress, on Surgery, by Professor Volkmann, was specially noticeable in that it attributed to the doctrine of asepticism and its application, the greatest advance which since the year 1870 has marked a new surgical epoch.

"The antiseptic method," says he, "has elevated surgery to the rank of the latest experimental science, by rescuing from the domain of chance the results of our labors. Never has a discovery been made in surgery which has even approached this in its benefit to humanity in general. . . . The

<sup>1</sup> 1878-1879. Berlin, 1879.

principles of the antiseptic treatment of wounds will *never* again be abandoned, as long as the whole of our knowledge is not lost, no matter how our art or the points of attack may change." "The necessity of a primary disinfection of fresh wounds is, I believe, universally acknowledged." "Our views on the nature of contagia in the surgical department of hospitals, on their origin and breeding-places, have entirely changed." "The discovery of the mycotic (or fungus) nature of wound diseases has solved many problems." He boldly says, that because of the advance made by this great method of exclusion and prevention, "the surgeon of to-day must reproach himself severely if after an operation bagging of pus occurs, and especially if death occurs from pyæmia."

The lamented Raymond, in his address on Skepticism in Medicine, after naming as axioms in medicine, (1.) The absolute constancy of the laws which regulate life, and (2.) The strict subordination of phenomena to certain conditions which have to be determined, makes the peroration of his argument against medical skepticism thus:—

"When in these latter days the study of spontaneous generation led to the discovery of that world of infinitesimal organism which seem to beset us everywhere, one may well ask how the human species and how animal life itself can resist these myriads of invisible enemies, ever ready to take advantage of the least failure of the organism to penetrate in its room. Laying hold of this idea, a great surgeon, and also a thinker, Lister, has introduced a new method which diminishes and suppresses the chances of consecutive infection in the great operations, extends the limits of his art, and assures the almost infallible success of daring attempts from which surgeons recoiled but a short time ago.

"On the other side a man of genius, whose name I am proud to mention, my illustrious friend Pasteur, resuming and reducing to system our great Jenner's work, succeeded by the methodical attenuation of virus, in inaugurating the prophylaxy of virulent diseases, and thus opened up to us new and indefinite horizons. In view of such results, gentlemen, what ground has skepticism to rest on. We might indeed have to guard ourselves from excessive enthusiasm, if our admiration were not fully justified by the discoveries already made." Thus he shows that preventive medicine is furnishing to the general science and art its strongest defense against the charge of empiricism and uncertainty. He also defends the "*Vis medicatrix naturæ*" of Hippocrates as worthy of firm belief, because it is "this force of vital resistance upon which we rely as our aid both in prophylaxis and cure." "Taking into account," says he, "the great facts made clear by the light of etiology, pathological anatomy is no longer a meditation upon death but the science of indications," a principle, we may add, which hygiene and preventive medicine applies with such confidence and with such success, as to make the art of preserving from diseases as conservative and essential as that of cure.

The whole of the address of Professor Huxley on the connection of the biological sciences with medicine is, in one view, but a profound and philosophic argument to show how the full knowledge of all life is the true

science and art of medicine, and its highest exercise in preventing interference therewith by other causes, including other lives, although our lack of knowledge of life makes its pathology and the dealing with the perturbations causing it a necessary part of the art.

He thus makes "the great truths respecting animal and vegetable life," and the study of the laws of their maintenance, the real pith and power of our calling, so that the entire address announces and defends the methods of etiological and preventive investigation even more primarily and as radically as it does the true basis of the healing art.

The address of Dr. Billings, our own ex-president, on Medical Literature, could not of course have technical reference to hygiene; but I may be permitted to say that in view of his well-known relation to the progress of interest in public health in this country, and his present national connection therewith, the recognition accorded him and the enthusiasm with which his address was received was of itself more than a volume for the department in which we labor, and for this Association in which he is our able collaborer. I happened to be standing with three or four of my own countrymen near the door as Sir James Paget came from the platform, and I only wish I could convey to you the heartiness with which he greeted us by saying, "That American has beaten us all."

Professor Foster, president of the Section of Physiology, emphasized the discovery of Hooke as to the effect of the air in respiration, on the blood, the work of Hales, who, as a philosopher and not as a patentee, invented a ventilator for the jails, and of Dr. Black, who "moved on the theory of respiration a step by demonstrating the presence of carbonic acid in expired air;" and so of others who studied the physiological basis of life, and showed that the animal body is an "exquisitely adapted self-regulating machine, which," as he says, "we prize, and justly prize as our leading view to-day." It is on this ground that the preventive art seeks to deliver it from self-imposed or society-imposed burdens, to protect it from the alien forces that from within or by surroundings imperil it, and thus to give it its normal chance to show that life was made to live.

The names of such physiologists as Dr. Pavy, Dr. Carpenter, Prof. Gamgee, Prof. Huxley, Dr. Klein and Dr. Burden Sanderson, Prof. Roy and Prof. Yeo, as identified with this Section, and our remembrance of what their work is and has been in state medicine, is itself the index of the essential relations of the two.

In the Section of Pathology, the opening address of Dr. Wilkes reads so much like a paper on preventive medicine, that we are reminded that its first disciples were those who, in the field of pathology, by studying the causes of disease, were led to consider its limitations.

He shows how — in view of the "influence of our ordinary surroundings;" of the parasitic nature of many maladies; of the doctrine of evolution as applied to the progressive development, and we may add to the progressive limitation of infectiveness; and also of the evidence that growths once called malignant or constitutional are accidental, under an ascertainable law of accident — disease is not only a deviation from the healthy standard, but in-



cludes within the range of its pathology a study of those special questions which have to do with causation through incidents and surroundings.

Here again such papers as that of Professor Klebs, of Prague, and Professor Fokker, on "The Relations of Minute Organisms to certain Specific Diseases;" that of Dr. Carter, on "The Aspects of the Blood-spirillum in Relapsing Fever;" that of Dr. Osler, on "Infectious Endocarditis;" that of Professor Lister, "On the Relations of Minute Organisms to Unhealthy Processes arising in Wounds;" that of Dr. George Harley, "On the Modus Operandi of Pathogenic Germs in the Production of Disease in the Human Body;" that of Dr. Creighton, on the "Infection of Tuberculosis by a Virus Introduced from Without," — serve to illustrate the practical devotion of this Section to such questions.

Indeed, the Section itself in generous rivalry sometimes seemed to vie with that on State Medicine in the handling of identical themes.

I listened to no discussions more thrilling or noteworthy than that in which Pasteur, Bastian, Lister, and Virchow were the contestants.

In the great field of Practical Medicine, so inclusive of all the rest, we might almost rest the proof of its intimate relation to the preventive art on the prominence of such names as those of Professor Gardner of Glasgow, Professor Acland of Oxford, and Dr. Radcliffe of London.

It seemed as if sanitary medicine was about to encompass our art with its protective ægis of hopeful security, and teach us how to mitigate or abolish many of the most deadly of human ailments. With no small degree of probability, it is enlarging the doctrine of the specificity of diseases, is associating their types with forms derived from without or produced within, and pointing out procedures by which the introduction can be prevented, or the system so preoccupied as respectfully to decline attack. And be it noted for the benefit of the laity that both our science and art, however incomplete, are far ahead of their practice, of which the neglect of vaccination and of godly cleanliness may serve as illustrations.

Sir William Gull, in opening this Section, used weighty words when he spoke thus: "Perhaps no more important step has been made in practical pathology than the proof that some at least of the contagia are organized solids. This discovery, which it has tried the patience, experimental skill, and scientific criticism of the best observers to establish, has brought us at length within view of that which has hitherto been so mysterious.

"To have been able to separate, though imperfectly, the contagious particles; to have come to the conclusion that no fever-poisons are soluble, is a hopeful preliminary towards forcing them to yield up the secret of their nature. If 'solidism,' as a theory of organic processes, wanted confirmation, we could point to nothing more striking than the present established views on putrefactive changes, and to the amazing fact that the normal textures and fluids of the body resist decomposition unless invaded by microscopic organisms." The doctrine of asepsism and its applications is far broader in its relations to all medical practice, than the technical talk about antiseptic methods would indicate.

Dr. Allbutt, of Leeds, in discussing the origin and cure of scrofulous neck,

says "a careful survey of causation will show that artificial scrofula is at least as common as the natural." Of one of the local causes he speaks of the "septic kind as most effective," and says, "a thorough knowledge of these facts will lead to prevention, perhaps may lead to complete prevention of scrofula properly so called."

Dr. Roberts' paper on "Bacteruria," or the presence of bacteria in fresh voided urine, shows how this organism corresponds in its microscopical character to the common putrefactive bacterium (*bacterium termo*), and having colonized in the bladder by proliferation, and perhaps by the action of certain products as a ferment, causes irritation of the bladder. The study of the etiology resulted in treatment by thirty grain doses of salicylate of soda twice a day, and the cure is complete in the cases given.

Dr. Guérin, of Paris, treated of typhoid fever considered as a fecal intoxication, while Surgeon John Martin, of the English army, sought in the military section to show that it belonged to the pathological group of septicæmia.

In the Sub-section on Throat Diseases, the papers of Dr. Mackenzie, of London, and of Dr. Tobold, of Berlin, on Diphtheria, give large recognition to the doctrine of antiseptics as to be applied locally as well as generally, while the plan of Dr. Justi, of dealing with whooping-cough as an infectious disease, localized in the organs of respiration, to be early met by insufflation of quinine with salicylate of soda, is also in the direct line of preventive methods, and a recognition of the plan of guarding the air passages from outer causes.

Professor Rossbach, of Wurzburg, although claiming laryngeal ulceration to be of a specific nature, yet admitted it to be the opinion of most recent observers that it is due to infectious poison which often comes from without.

Professor Jacobi, in the Section on Diseases of Children, advocated the chemical view of the nature of the contagion of diphtheria, and gave prominence to a line of study that will yet largely occupy those who are engaged in inquiry upon the etiology and prevention of disease. While animal or vegetable organisms have causal relation to some diseases, it is not necessary to account for all contagious diseases in that way.

Low forms of matter may make such chemical alliance as to become toxics independent of the low forms of life which may appear in the midst. It may yet behoove us to study as closely the origin of animal poisons as we are now studying the phenomena of germs. There is a chemistry of disease which is not to be lost sight of in our chase after the minute forms of vegetative life, real and operative as they may be. This belongs within the limits of zymotic chemistry, and the results of changes in this microscopic life may be chemical too.

In the Section of Surgery, the opening papers of Mr. Spencer Wells, on "Recent Advances in the Surgical Treatment of Intra-peritoneal Tumors," and of Lawson Tait, on "Recent Advances in Abdominal Surgery," recognize the progress of hygienic methods. Mr. Tait attributes important advances "to increased attention to hygiene and to the intra-peritoneal method of operating."

While he does not adopt the spray method, no one more thoroughly accepts the preventive and antiseptic treatment. A distinguished surgical professor, who followed up the ovariectomy operations to the number of fifteen, during our stay in London, told me, that in all surgery he had never been so impressed as to the details of cleanliness. "Why," said he, "I saw Mr. Tait wash out an abdomen until he had poured pitcher after pitcher in and rinsed it to the purity of the purest spring water." They excel us, he thought, in this operation more than in any other, and in it only in the completeness of their purifying and hygienic methods.

Professor Gamgee, in treating of failures in the primary union of operation-wounds, gave equal emphasis to antiseptics, absorbent gauze and dressings, and that drainage which is an additional guard against the retention of septic or irritating material. The same methods were emphasized in a paper by Professor Humphrey, of Cambridge. We allude to these as not less emphatic in their hygienic methods than is Professor Lister, who, in a paper on the same subject, illustrated the application of his antiseptic method in a way that I need not enlarge upon here, since it is well known to all sanitarians. It may not, however, be so extensively known how far it has been applied throughout Europe, and indeed wherever surgery is practiced, and even where not adopted, how the antiseptic treatment in other forms has marked an epoch in surgery, the success and honor of which falls strictly within the domain and within the historical progress of preventive medicine.

The Section on Military Surgery, with equal significance, had important papers, "On Antiseptic Treatment of Wounds in the Field," by Dr. Lilburne, of the Royal Navy; "On the Disinfection of the Battle Field," by Dr. Ennes, of Lisbon; "On Antiseptic Dressings," by Dr. Beck, of the Fourteenth German Army Corps, thus again illustrating in their nationalities as well as their essays how widespread is the influence of the preventive method. To this may be added the additional evidence that in ophthalmic surgery, Professor Horner of Zurich, Dr. Reymond of Turin, Professor Leber of Göttingen, and Dr. Emmert of Berne, occupied the second day with papers on antiseptic methods in eye-surgery.

In the Obstetric Section the opening paper was "Antisepsis in Midwifery," by Professor Spiegelberg, of Breslau. He opens with the remark, "That the great reform in surgery brought about by the antiseptic treatment could not fail to have a deep influence upon the treatment of the complications in child-bed, as it was well known long ago that the latter are the same that arise from wounds. Dr. Mérière emphasized the diseases of women as surgical disorders, and others in various ways gave recognition to the fact that the avoidance of retained secretions, and so of septic accidents, is a chief consideration in this practice.

While in the Section of Mental Diseases the antecedent treatment for mental threatenings did not come prominently before the Section, the outline of Dr. Clouston, of Edinburgh, as to the "Teaching of Psychiatric Medicine," fully recognized the importance of some knowledge of mental diseases for all practitioners, so that they can be ready to interpret the earliest symptoms, to study tendencies, and to anticipate in order to prevent.



In the Section of *Materia Medica* and Pharmacology, one would scarcely look for anything bearing especially on hygiene, yet the papers of Professor Binz, of Bonn, and Professor Fokker, of Groningen, "On the Action and Uses of Antipyretic Medicines, including the influence exerted by medicines administered internally upon Septicæmic and allied Conditions," have in them some most important theses such as these:—

(a.) Febrile diseases commonly owe their origin to the introduction and rapid development of substances akin to ferments. Several of these have been shown to resemble yeast in being low vegetable organisms, or in being derived from such organisms. They enter the glands where they undergo multiplication, increase the metabolic processes, and generate products of decomposition, which exert a paralyzing action on the nervous system and raise the standard of temperature throughout the body.

(b.) Quinine, our chief antipyretic, acts by directly combating the efficient cause of the disorder, and by checking the abnormal metabolism going on in the body. The nervous system takes no part, or only a secondary part in this operation.

In intermittent fevers quinine *prevents* the paroxysm by attacking the infective cause.

(c.) The past history of therapeutics and recent achievements in the domain of etiology and pharmacology, entitle us to assume that by persistent scientific inquiry and practical observation we may succeed in discovering a specific antidote for every species of infective or septicæmic malady.

Professor Fokker assumes that antiseptics act either by lowering the temperature of the body by interfering with the circulation, or that they exert a destructive action in virtue of their antiseptic properties on the humble organisms to which the pyrexial phenomena are presumably due. The second of these hypotheses is the more likely one of the two. It may, of course, be objected that such remedies can never be administered in sufficient quantity to insure their presence in the blood in such proportions as to render it aseptic, or at any rate to exercise an antiseptic influence.

But it must not be forgotten that the organisms in question have to maintain "a struggle for life" in the interior of the body; so that any hostile factor, though unable of itself to check their multiplication, may succeed in doing so when combined with others equally hostile to bacterial life.

It is quite possible, moreover, that antipyretic medicines may accumulate in particular organs, which may then exert a disinfectant influence upon the blood." A remark that tallies with one of Professor Binz, that in intermittent fevers the substantive element is the poison deposited in the colorless corpuscles of many organs, especially the spleen.

Some of these views are especially interesting to me because I have long, by clinical observation and trial, been led to think that when one child of a family is attacked with a zymotic disease, or when any such disease threatens to spread, it is possible to administer antiseptics or medicines unfriendly to these particulate poisons which will prevent the series of changes which make up the disease. This view is not based upon any doctrine of specificity, but on a belief derived chiefly from diphtheria and scarlet fever,

that there are various articles, such as quinine, potassium chloride, ferrum chloride, alcohol, etc., whose presence can be maintained in the blood in small quantities, and so prevent the setting up of those processes which constitute the gravity of such diseases.

If so, we have a plan of treatment likely to have great practical application to the prevention and limitation of epidemics, and more likely to be available than most of the suggested systems of inoculation.

If any one were asked what subjects were most prominent, both at the general meetings and the several sections, the answer would be the antiseptic treatment as applied in surgical operations, the relations of minute organisms to diseases, and the special applications thereof in a system of inoculation. These you will note are all more closely and radically identified with the study of prevention than with that of cure, and involve the most minute and searching inquiries into the conditions and relations of vegetable, and human life. These inquiries are more difficult, and more essential, because of the infinitesimal character of the subjects. Queen Mab, with her team of little atomies, is riding rampant over all the biological territories. Binocular microscopes, minute analyses, closest observations, classified and abundant facts, and the verifications of treatment, are all alike indispensable for comparison and verification.

A brief notice of the paper of Professor Klebs, "On the Relation of Minute Organisms to certain Specific Diseases," and that of Pasteur, on "Vaccination in Relation to Chicken Cholera and Splenic Fever," will outline this department of sanitary inquiry. I think the paper of Professor Klebs is a full and fair statement of the germ theory in its practical relations to disease. His first inquiry is, What is their relation as causes? He very properly shows that the idea of an organized nature of the elements of disease is not very new. It would seem as if the hypotheses of Van Helmont, Schönlein, and Henle, and the researches of Bassi and Andonin upon the nature of the muscardine disease of the silk-worm and the fungus of fevers, only lacked an earlier result because of the need of more knowledge of the laws of minute life and more instruments of precision. To show how definite were some of these views, I may quote as follows from "The British and Foreign Medical Review" of April, 1840, which says: "Henle, of Berlin, has supported the theory by new facts and analogies. The diffusion of contagion has a close analogy with fermentation, and Cagnard, Latour, and Schawnn have shown that fermentation is the decomposition of organic fluids by minute vegetables of the lowest class. Putrefaction is a destruction of organic matter effected by infusoria, and not a mere decomposition into elements. One contagious disease, the muscardine of the silk-worm, is known to depend on the development of a vegetable parasite. The germs are innumerable and spread with the greatest rapidity."

"In mixtures certain genera and infusoria appear, and then give place to new genera. Individual cases of disease may be caused by one generation of parasites; an epidemic by successive generations.

"Each epidemic disease has its specific animal contagion; its specific genera of infusoria. Henle (who is justly considered one of the best micro-

scopic observers of Germany) has proved the existence of this cause and the truth of the theory in every way but one: he has never seen the epidemic infusoria."

The three points for inquiry are thus well stated:—

I. "We have to inquire whether the lower organisms which are found in the diseased body, may arise there spontaneously, or whether even they may be regarded as regular constituents of life.

II. "The morphological relations of these organisms have to be investigated, and their specific nature in the different morbid processes has to be determined.

III. "We have to inquire into their biological relations, their development inside and outside of the body, and the conditions under which they are able to penetrate into the body and there set up disease."

Each of these divisions is so accurately elaborated as to give exactness of statement. While all the findings of Dr. Klebs may not yet be accepted, his rank as a candid and skilled observer, and the verification which some of them have obtained, entitle his views to large credence. His classification and nomenclature also much aid the ordinary student who, because of clinical duties, cannot devote himself to laboratory work, or call over the names of the infinitesimal races as familiarly as he would repeat the genealogical prefixes of his own family.

Because we so naturally connect the idea of motion with animal life, we need constantly to be reminded, that thus far in the tracings of the connection of organisms with disease we have much more to do with vegetable than with animal life.

The three groups under which rank all the various diseases usually spoken of as zymotic, and many more, are all associated with vegetable life, and in speaking of them he says: "The animal parasites need not here to be considered since their effects in producing disease are either less important or else such as admit of no question. When in relation to the vegetable parasites we find the names of such a catalogue of diseases as fevers, ringworm, thrush, leptothrix (which our own Professor Burrell has traced in other effects,) tubercle and scrofula, as in the full book of Dr. Schiller (see Simon address), the anthrax, splenic, and other diseases of animals, the periodic and continued fevers, diphtheria, croupous pneumonia, and some rheumatisms, erysipelas, mumps, scarlatina, and measles, with cholera, yellow fever, and many others also waiting for probable recognition, we begin to find that there is in them a wideness like the wideness of the sea. And the great and significant origin common to the fever group of these diseases, is that they come to the body more or less directly from the soil," and so emphasize that part of our work which consists in the prevention or oxidation of soil-pollution.

The bearing of all this upon the recent results of labors in which comparative and human medicine have so efficiently joined hands, as represented by Chaveau, Pasteur, Dr. Greenfield (see Simon), and Touissant, make this paper with its details introductory to that of Pasteur, in which he explains the methods by which he is able so to deal with malignant organisms



as to make them benign, and then use their benignity as a protective from what would otherwise be the destructive assault of myriads of their *comrades*, insinuating with intensive disturbance and annihilating the higher animal life.

This system of protective "vaccination" or implantation, as already largely applied in France to the prevention of anthrax, opens up to us great possibilities for the future, all in the line of the special study of this Association. It is of note, too, that the oxygen which is the vigor of the animal life seems to be the limitation to the rampant vegetable life, since Pasteur attributes this attenuation of the virus solely to the action of the oxygen. If so, it seems to give new force to the relation of air dilution and ventilation to the limitation of nearly all the communicable diseases.

It will be noticed that thus far we have not touched upon the Section of *State Medicine*, our aim having been to show the degree to which the subject upon which our Association is employed permeates the whole science and art of medicine. In fact, this Section might be regarded as only differing from the others in its relation to hygiene, because, in view of what has been developed over the whole field of medical inquiry, it considers more specifically what are the duties of law and nationality in regard thereto.

The address of our distinguished leader, Dr. Simon, with his usual ability, applied itself to the consideration of this problem. It outlined the work devolving upon the body politic, and as already accepted by the English nation, to a degree the extent and variety of which has been but very partially reached in our own legislation.

Even the concise summary is too lengthy to repeat, but shows that Great Britain regards the health of the people as an interest not less national than personal, and has intended to guard it with all practicable securities against trespasses, casualties, neglects, and frauds.

Some of the subjects upon which valuable papers were read before this Section were: "The Principles that should guard us in attempting to Prevent the Diffusion of Disease, with Special Considerations of Imported Diseases," on "Syphilis, Scarlet Fever, and Hydrophobia," the "Influence of various Articles of Food in spreading Parasitic, Zymotic, Tubercular, and other Diseases." The paper of Dr. Creighton, "On Tubercular Disease as conveyed by Animals;" that of Dr. Ennes, of Lisbon, "On the Prevention of Trichiniasis;" another, "On a Specific Acute Disease attributed to the Use of Pork," by Drs. Ballard and Klein; that by Professor Tidy, giving a "Chemical View of some Cases of Meat Poisoning;" that of Ernest Hart, "On the Influence of Milk in spreading Zymotic Diseases," and that of Dr. Milroy, "On the Influence of Food on Health and Disease,"—show how prominently the relations between man and animals in the causation of disease is attracting the attention of sanitarians.

I shall not here attempt to canvass these and other valuable papers before that Section, because it will naturally attract the notice of those who might not have either the time or opportunity to review the entire sayings and doings of the Congress.

The spirit and work of the Section was such as to show that there was

comprehension of the real status which public or state medicine has secured ; a recognition of the fact, that we are in the presence of questions of the most consequent import, which have in the last decade pressed themselves upon professional and governmental attention, and that the workers in the field of sanitation have under observation and in hopeful investigation, matters of the most pressing importance to personal and national life and well-being.

There was another incidental recognition of the wide range of sanitary inquiry. The International Sanitary Exhibit at South Kensington was so much an outcome and attachment of the Congress, that it calls for a few lines of notice.

When Sir William Jenner, in his introductory address before the Congress, sought to present from the great catalogue of British physicians, "the ideal of the worthiest workers in our science," he chose the name of Edmund A. Parkes, the Hippocrates of hygiene, to express the embodiment of all that is true and worthy and noble in our professional life. "He stands out," said he, "so preëminently above all others that I have known as the absolutely typical scientific physician, that I must mention him and commend his museum to your inspection." The medical faculty of England had in 1876 established as his memorial this Museum of Hygiene, to be called by his name, "to perpetuate the memory of a man whose life has been of almost unparalleled utility to others." The plan of extending this into a grand medical and sanitary exhibit of four week's duration met with the approval of the Congress, and resulted in the bringing together of such a variety of instruments and appliances for medical and sanitary administration, as showed that in neither department are we workmen without our tools. His Royal Highness, the Duke of Edinburgh, was its patron ; the Right Hon. Earl Spencer, its president, and John Eric Erichson, F. R. S., President of the Royal College of Surgeons, the chairman of its committee. About five hundred exhibitors made displays in seventeen sections, of which over half were devoted to sanitary exhibits.

This helps to mark an era in sanitary science and art, since upon these various appliances so much depends the application of principles and the evidence of their results in the better protection of health and life. This is doubly important since the pioneers in hygiene are those who, because of their professional type, are not likely to be well informed in the details of mechanism and its adaptations, and because both we and the public can in no other way be so readily educated as by coming to see, handle, and understand those devices which are the best test either for illustration or rejection of the principles and designs proposed.

A want of familiarity on the part of medical men with applied physics and mechanics and of skilled ability to detect the unfitness or inadequacy of constructions, plans, and instruments, proposed or adopted, is, we think, the weak point in hygienic bodies largely made up from the medical profession, and therefore we welcome it as a good omen not only when the engineers and architects and artisans join our ranks, but when by seeing and examining these devices *we* become partners in a common knowledge to

that extent which is desirable for those who to some degree must have and pass opinions on each other's methods.

This exhibit, therefore, had much sanitary significance, and all the more because a committee of our own Association is just considering what can be done by our own country in a similar direction.

For details of the manifold devices and improvements, I must refer you to the descriptive list of awards. The entire work of this Congress, and all thus appertaining thereto, is permanently valuable, because it is a reckoning for the past and the present in order to gather force and direction for the future. The line of direction for onward march is in part determined by the historical record of what has been attained, and still more by the exact tabulation of results; the accurate statement of present position and attainments.

These questions of pressing importance have to do with the laboratories of the school of science, and with those greater and unlimited number of *laboratories* of animal life in which nature and disease carry on their most marvelous experiments, as also with that legal and governmental ordering which decides just how the protection and preservation of mankind in health falls under the purview of the state. The physical sciences, the art of the physician, and the skill of the political economist, are alike summoned to the highest exercise of experiment, skill, and statesmanship, in order that a threefold cord not easily broken may form the bind-web of personal, civic, and national existence.

While we must bend in reverence to science, we must not attach too much importance to what individual observers claim to have seen in the laboratory. There are men who see what they wish to see, and yet are honest observers. Their fond hypotheses have lenses more powerful than the microscope, and their scientific culture has a turbidity of prejudgment as decided as that of the culture fluid in which micro-organisms revel.

The grander and more important sphere of those other witnesses and sometimes performers of experiments, the clinicians, the health inspectors, the patient recorders of closely observed and well classified and properly adjusted facts, also needs to be guarded against all those notions and imperfect generalizations, which we so incline to seal and certify with the positive sign-manual of "my experience."

In our right view as to the acceptance of that theory which accounts for the largest number of facts, we must not seek to imitate the correlation and conservation of forces in nature, by correlating and conservating all the forces of disease about one specialty of doctrine.

In dealing with microzymes we are not outside the domain of chemistry, but rather in that wonderful microcosm of zymotic chemistry in which the yeast plant and acetic and alcoholic fermentation have long been known; in which we have to deal with chemical changes involved in the rapid decompositions of matter. The doctrine of rival life and rival growth does not vacate that of chemical changes as causing disease.

It no doubt is true that many diseases are to be accounted for by animal and vegetable parasites, but we must see to it that we do not exclude the



idea of the chemical origin of disease as well as of other poisons ; that we do not lose sight of the effect of vegetable and animal decay other than that which has to do with spores and animalculæ ; that we do not overlook *that* fertilization and consequent viciousness which may depend solely upon the rich luxuriance of the filth-soil we furnish, and the after-results of organisms and excretions made septic and abundant because of the high food we have pampered them with. Thus the fact of the different susceptibility of individuals is one of the studies of preventive medicine, because it indicates what agrees and what disagrees with these forms of existence.

In this view we have opened up to us what may be termed both the ethical and the political application which gives the name of State Medicine to the subject.

The field of sanitary jurisprudence is wider by far than that of medico-legal jurisprudence.

It would stand a better chance if like the latter its decisions came first from the courts, instead of from the more political legislatures.

But, as it is, we must convince our constituencies that we know enough of causes to make it wise for them to help us in fact-gathering as they do in vital statistics and in State and National Boards of Health, while we must illustrate our power of interrupting causes, *i. e.*, of prevention, by the limitation of epidemics, and by applying our knowledge in the avoidance or removal of the commoner causes of disease.

The International Medical Congress, representing the nationalities of every civilized country in the world, and giving opportunity for the collection and comparison of sanitary attainments and desiderata as never before, serves to certify and commend that work, the success of which depends on the continuous efforts and the more frequent assemblage of such an association as this.

The progress is too real and solid for a wild enthusiasm ; the consciousness of the work before us is too solemn and too full of import to humanity for any other zeal than that which is according to knowledge.

Therefore, as brethren who so long and so pleasantly have worked together for a common public welfare, we have new encouragement to work on, patiently, accurately, in a cause that cometh by observation, knowing that in every land we have fellow-workers ; that young and capable students are constantly joining our ranks, and that scientists and clinicians, citizens and statesmen, are more fully realizing that the cup which Hygeia holds in her hand in these modern days, has had poured into it a stream of knowledge whose waters sparkle with the promise of stronger vigor and healthier life.

## TRANSACTIONS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

AT ITS NINTH ANNUAL SESSION, SAVANNAH, GA., NOVEMBER 29—  
DECEMBER 2, 1881.

TUESDAY, NOVEMBER 29.

THE ninth annual session of the American Public Health Association was called to order at Masonic Temple, in the city of Savannah, Ga., at 10 o'clock this morning, by the President of the Association, Dr. CHAS. B. WHITE, of New Orleans, La.

Prayer was offered by the Rev. Dr. I. S. K. AXSON, of Savannah.

The Secretary, in behalf of the Executive Committee, presented the list of names proposed for membership by the Committee, and those named were elected.

The Secretary called for all papers offered the Association and not yet handed in.

The Secretary, in behalf of the Local Committee, announced the invitation of Dr. Louis H. Falligant, of Savannah, to the members of the Association to a reception at his residence, also that the Western Union Telegraph Company had extended the courtesies of its lines, and the Georgia Historical Society and the Savannah Cotton Exchange the courtesies of their rooms.

The Secretary, for the Executive Committee and Advisory Council, to whom was referred the resolution of the Association passed at New Orleans (Eighth Annual Session) in regard to a National Museum of Hygiene, submitted a synopsis of their views favoring the creation of such a museum under some department of the government.

DR. ALBERT L. GIHON, United States Navy, submitted the following resolution, which went to the Executive Committee under the rule :—

*Resolved*, That a committee of three be appointed to confer with the Surgeon-general of the Navy with respect to the establishment at Washington, D. C., of a National Museum of Hygiene, under his auspices and with the coöperation of the American Public Health Association, for the illustration and dissemination of the principles and practical applications of sanitary science for the protection of the public health.

The Secretary, for the Executive Committee, presented the following resolution :—

*Resolved*, That this Association hereby directs its Executive Committee to secure for it such Act or Certificate of Incorporation under the laws of such State, or the General Government, as it deems best, as will secure to it the powers and privileges of incorporated bodies.

On motion of DR. GUSTAVUS A. DEVRON, of Louisiana, the resolution was adopted.

The Secretary, for the Executive Committee, presented the following resolution : —

*Resolved*, That the Secretary of the Association should be *ex officio* the Secretary of the Advisory Council and a member thereof.

On motion of DR. D. C. HOLLIDAY, of Louisiana, the resolution was adopted.

DR. HENRY B. BAKER, of Michigan : —

MR. PRESIDENT, — I do not think the resolution in regard to incorporating the Association was fully understood. Several gentlemen in my vicinity state that they did not understand it, and I did not myself. I presume the Executive Committee have good and sufficient reasons for their recommendation, and that these may be stated, and the matter fully understood. I move a reconsideration of the vote adopting the resolution. Carried.

The Secretary, in behalf of the Executive Committee, stated the difficulties under which the Association labored from having no legal status.

DR. BAKER, of Michigan : —

MR. PRESIDENT, — The reasons given by the Secretary are, as I had no doubt they would be, fully satisfactory, and I move the readoption of the resolution. Carried.

The Secretary, for the Executive Committee, presented the following resolution : —

*Resolved*, That no elective member of the Executive Committee shall be at the same time a member of the Advisory Council if there is another member of the Association from his State or service.

On motion of DR. JOHN H. RAUCH, of Illinois, the resolution was adopted.

The Secretary read the letter of Governor Porter, of Indiana, appointing Dr. James D. Gatch, of Indiana, his representative, and that of Governor Hagood, of South Carolina, appointing Dr. F. Peyre Porcher, as his.

HON. ERASTUS BROOKS, of New York, offered the following resolution, which went to the Executive Committee under the rule : —

*Resolved*, That the Executive Committee of this Association is hereby instructed to memorialize, in the name of this Association, the Congress of the United States in favor of such legislation as will bring about a proper coöperation between the general government of the United States and the several State governments, for a uniform and efficient system of the registry of the deaths, births, and marriages of the population.

The Secretary read a telegram from the First Vice-president, Prof. R. C. KEDZIE, of Michigan, regretting his enforced absence ; also a letter from Ex-president, Dr. E. M. SNOW, of Rhode Island, regretting his inability to be present.

The President announced that Dr. B. JOY JEFFRIES, of Massachusetts, would test the members for color-blindness during the session.



The Secretary reported the communications received from the National Board of Health in regard to the subjects submitted to it for its consideration, viz. :—

(a.) The draft of a law to prevent the spread of contagious and infectious disease.

(b.) Inquiry into the nature and control of diphtheria.

On motion of Dr. E. M. HUNT, of New Jersey, the communications were placed on file.

The Secretary read the communication of Abby Hopper Gibbons, of New York, in behalf of the New York Committee of the International Federation for the Abolition of Government Regulation of Prostitution.

On motion of Dr. GIBON, United States Navy, the communication was placed on file.

A paper, by Dr. EZRA M. HUNT, of New Jersey, on "The Contagious Diseases of Domestic Animals," was read by Dr. RAUCH, of Illinois. (See page 155.)

On motion of Dr. DEVRON, of Louisiana, it was voted that all discussion on papers concerning the diseases of animals be deferred till all such papers should be read.

(The President temporarily resigned the chair to the Second Vice-president, Dr. HENRY F. CAMPBELL, of Georgia.)

The Secretary read a paper on "Disease among Texas Cattle,—a continuation of a report made in 1880," by Dr. JOS. R. SMITH, United States Army. (See page 114.)

EDW. FENNER, Esq., of Louisiana, read "A Report of the Examination of Hogs at the New Orleans Abattoir during the summer of 1881," submitted by Dr. C. B. White, in behalf of the New Orleans Sanitary Auxiliary Association. (See page 135.)

Dr. J. M. PARTRIDGE, of Indiana, read a paper on "Trichinæ Spiralis." (See page 140.)

Mr. FENNER, of Louisiana, moved the appointment of a committee of five to take into consideration the questions presented in the papers on Hog and Cattle Disease, and to report such resolutions thereon as they deem wise at a future day.

Discussion on the motion took a wide range, and was participated in by Drs. RAUCH, of Illinois; AMES, of Massachusetts; DEVRON, of Louisiana; HEWITT, of Minnesota; AGNEW, of New York; FALLIGANT, of Georgia; and Hon. Mr. BROOKS, of New York.

(Owing to the absence of the stenographer detailed report of the discussion was not taken, but each gentleman was requested to furnish the Secretary with a copy of his remarks, but the following only have been received. — SECRETARY.)

Dr. C. R. AGNEW, of New York :—

MR. PRESIDENT, — As a sanitarian and a stock raiser, I would say that there is one point brought out in the papers which impresses me as being of peculiar value, namely, that the *ranging pig, the pig of the woods and extended pastures, is free from trichina*. The knowledge of that fact should be widely spread, so that the hygiene of the pig may be considered.

The pig is by nature one of the most cleanly of domesticated animals. To feed the pig on excrements, as is almost universally done, is to make it the seat of such parasites as the trichina. I believe the disease in the pig to be a filth disease, and the cure for it is to give the pig the benefit of a hygienic life.

DR. GUSTAVUS DEVRON, of Louisiana : —

MR. PRESIDENT, — I think the subject of trichina in pork of sufficient importance, both in a sanitary and monetary aspect, to call for a special commission to be appointed by Congress, or the National Board of Health, to continue the investigation of the causes, and to ascertain what means should be used to prevent swine from becoming the hosts of the trichina.

I am also in favor of stringent legislation, both National and State, to prevent the sale of trichinous pork as an article of food in any form ; but knowing the delays in obtaining the required laws, due to the potent influence of interested opponents to the same, to say nothing of the litigation which usually follows the enforcement of laws protecting human life, when these laws interfere with private or pecuniary interests, I would advise each man, woman, or child of this country, to become his own inspector of pork before using any of it as food.

The fear of trichinosis has caused Germany, France, and Great Britain to issue restrictions almost prohibitory of American pork, and from the same fear almost every German household has on its side-board a small microscope of proper construction and suitable power for the easy detection of trichina in pork.

The people of the United States are likewise awaking to the dangers of trichinosis, and fortunately one of our best and most enterprising manufacturers, an optical company of Rochester, N. Y., has just issued a novel, efficient, and cheap instrument, which I now have the pleasure of exhibiting to you.

This trichinoscope costs only three dollars, and full instructions for its use accompany each instrument ; its use is so easy that any intelligent butcher boy or servant can in a few minutes be taught to use it and to detect the presence of trichinæ in pork.

Let every housekeeper use a trichinoscope and refuse to deal with any butcher offering for sale trichinous meat ; that butcher will soon find it to his interest to examine his pork before offering it for sale, and thus self-interest (the most potent factor to human actions) will soon force the stock-raiser or farmer to use every means in his power to prevent his hogs becoming infected with trichinæ.

DR. L. A. FALLIGANT, of Georgia : —

MR. PRESIDENT, — Whilst we are discussing this question of cattle diseases and their possible introduction into the human body by the agency of the animal's milk, I have thought it not inopportune to make a suggestion with the purpose of eliciting information or stimulating investigation over a wider field. It is well known to most of you that if a child be nursed by a pregnant mother, it usually happens that the child wastes away into a state of marasmus, — not because the milk is a poison, as is popularly be-

lieved, as that it is lacking in nutritious properties, the child within her appropriating its best ingredients and leaving but slops for the child without her. Now these very parents will, by advice, send out and get cows' milk and give it to their little ones without ever inquiring whether the cow is with calf or not,—that is, whether the milk of the cow, like that of the mother, may not be lacking in nutritive properties, and whether this character of the milk may not be the cause of more sickness in children dependent on it than is generally supposed.

I would be glad, Mr. President, to obtain all possible information on this subject, which, I fear, covers a broader region than has heretofore been supposed.

DR. DEVRON, of Louisiana, answered as follows:—

There is yet doubt in the minds of many physicians of the poisonous or injurious qualities of the milk of a pregnant woman for her suckling baby.

I have known an ignorant French woman to nurse her first child not only during her second pregnancy but even after delivery of her second child, who died on the third day, and allowed him to continue until he weaned himself, several months later. This child was only inconvenienced by a slight looseness of the bowels for a day or two, after the birth of the second child.

In the case of cows, if their milk, when heavy with calf, was either dangerous or injurious, there would be but very little milk from our dairies fit for use, as I am informed that it is the universal custom of dairymen to bring the cow to bull as early as possible after parturition. The milk of the first eight days is the only one not offered for sale, and the cow generally ceases to give milk during the last month. As a physician I have never had any complaints about milk, due to the above-named cause.

DR. J. D. PLUNKETT, of Tennessee, raised the question of the scope of the motion.

HON. MR. BROOKS, of New York, offered to amend by inserting after the words "cattle diseases," the words, "and all questions relating to those diseases."

The mover, Mr. FENNER, of Louisiana, accepted the amendment.

Dr. Plunkett, of Tennessee, raised the question of when, under the motion, the committee was to report.

The motion was carried.

Papers on "*Trichinæ Spiralis* in American and German Hogs," by Dr. F. S. BILLINGS, of Massachusetts, and on "*Trichinæ Spiralis* in Hogs, Examined at San Antonio, Texas," by Dr. JOSEPH R. SMITH, U. S. Army (page 145), were read by title by the Secretary.

A recess was taken till 3 o'clock P. M.

#### AFTERNOON SESSION.

The Association reassembled at 3 o'clock. The President, Dr. WHITE, in the chair.

The Secretary, in behalf of the Executive Committee, presented the list of names proposed for membership by the Committee, and those named were elected.



DR. S. S. HERRICK, of Louisiana, read a paper on "The Comparative Vital Movement of the White and Colored Races in the United States." (See p. 266.) The paper was discussed by HON. ERASTUS BROOKS, of New York, Drs. HEWSON, of Texas, PORCHER, of South Carolina, DEVRON, of Louisiana, and the President.

(The stenographer being absent, the details of the discussion were not recorded, and the participants have not responded to the Secretary's request for copies of their remarks, with the exception of Dr. PORCHER, of South Carolina, and Dr. DEVRON, of Louisiana. — SECRETARY.)

DR. F. PEYRE PORCHER, of South Carolina: —

MR. PRESIDENT, — During an experience of several years in a Marine Hospital, among white seamen, I noticed the presence of syphilitic nodes frequently. But subsequently, having had charge for twelve years of hospitals in Charleston, where large numbers of the colored race were treated, I have never in a single instance seen a node on the tibia in the colored race. I would use some hesitation in making the statement were I not substantiated by the reports of a physician in Mississippi, who has published similar observations.

My experience in South Carolina is that there has been great mortality among the negroes since the war on account of exposure, improvident habits, inadequate clothing, etc., but the race is very productive and the disabilities in the way of marriage and cohabitation are so slight, that I think their numbers increase largely, relatively to the whites. Syphilis is far more commonly met with now among negroes than formerly, when they were more closely confined to the plantations. On the latter syphilis was by no means a frequent disease.

DR. DEVRON, of Louisiana: —

MR. PRESIDENT, — The negro, since he is free, does not receive, in sickness, infancy, or old age, the same care that he had from the master, whose chattel and property he was, and who was pecuniarily interested in his preservation.

The negro is no longer restrained from the abuse of intoxicating liquors of the vilest quality, and in the cities he becomes the victim of syphilis, contracted as well as inherited. Syphilis is supposed by many to be very lenient to the negro race, who do not seem to suffer as much from that disorder as the whites. This leniency is only apparent, for if it is true that the white man lives to go through all the horrible and disgusting stages of the disease before death relieves him, the colored man soon recovers, apparently, to die shortly afterwards from some other disease, which he can no longer resist; in fact, he dies from syphilitic debility.

While it may be true that in large cities, where whiskey, prostitution, syphilis, and small-pox decimate the negro, that race may not increase with the same rapidity as the white race, exposed to the same dangers but receiving better care, nevertheless, where the negro is not exposed to the above-named vices and diseases, or where his services are valued sufficiently to secure from the employer the same care he formerly received from his master, there the negro will be found to increase not only with equal, but even greater rapidity than the white race.

It will take at least another century before any preponderance of the black element over the white can make it unpleasant or undesirable for the white race to continue to live in the Southern States.

A paper on "The Kankakee. A Sanitary Problem in Indiana," by Professor JOHN L. CAMPBELL, of Indiana, was read by Dr. HENRY B. BAKER, of Michigan. (See page 279.)

Papers upon "The Disposal of the Dead" (see page 309), by Dr. W. H. CURTIS, of Illinois, and upon "The Relation of Alimentation in Relation to Infantile Diseases," by Dr. T. C. DUNCAN, of Illinois, were read by title by the Secretary.

The invitation of Dr. T. S. HOPKINS, of Thomasville, Georgia, to the Association to visit that place at the close of the session, was read by the Secretary, and, on motion of Dr. PLUNKETT, of Tennessee, it was voted that the invitation be declined, with thanks, for want of time.

A recess was taken till 7.30 P. M.

#### EVENING SESSION.

The Association reassembled at 7.30 P. M. His Honor, JOHN F. WHEATON, Mayor of Savannah, in the chair.

Addresses of welcome were made by Captain GEO. A. MERCER, representing the city (see page 11), and Dr. RICHARD J. NUNN, President of the Georgia Medical Society (see page 13).

The President of the Association then delivered the Annual Address. (See page 1.)

The Secretary moved the appointment of a Committee on Necrology, which was carried.

Adjourned to 10 o'clock A. M., Wednesday, November 30.

WEDNESDAY, NOVEMBER 30, 1881.

#### MORNING SESSION.

The Association was called to order at 10 o'clock. The President, Dr. WHITE, in the chair.

Prayer was offered by the Rev. J. O. BRANCH, of Savannah.

The Secretary, for the Executive Committee, presented the list of names proposed for membership by the Committee, and those named were elected.

The President announced the following Committees:—

*Committee on Necrology.*—The Secretary, Dr. Ames, of Massachusetts; Prof. J. L. Cabell, of Virginia; Dr. E. M. Hunt, of New Jersey; Dr. J. Berrien Lindsley, of Tennessee; Dr. J. G. Thomas, of Georgia.

*Committee on Diseases of Cattle and Hogs.*—Edw. Fenner, Esq., of Louisiana; Dr. J. H. Rauch, of Illinois; Dr. E. M. Hunt, of New Jersey; Dr. H. P. Walcott, of Massachusetts; Dr. J. M. Partridge, of Indiana.

*Committee on National Museum of Hygiene.*—Dr. Albert L. Gihon, United States Navy; Dr. C. W. Chancellor, of Maryland; Dr. Wm. H. Ford, of Pennsylvania.

DR. RAUCH, of Illinois:—

MR. PRESIDENT, — I was reminded by the suggestions in the President's address of the action of the Illinois State Board of Health in connection with the teaching of hygiene in medical colleges. It will be borne in mind by the members of the Association that, in addition to its ordinary duties, the Illinois State Board of Health is charged with regulating the medical practice of that State. I will now call attention to the minimum requirements for a medical college in order that it may be held in good standing. The Board, under the law, has authority to decide whether a school is in good standing or not. Our Board is a mixed Board. It is composed of representatives of three different schools. This is the unanimous action of the Board.

#### CONDITIONS OF ADMISSION.

- I. Creditable certificates of good moral character.

#### *I. Conditions of Admission to Lecture Courses.*

2. Diploma of graduation from a good literary and scientific college or high school. But lacking these, —
3. A thorough examination in the branches of a good English education, including mathematics, English composition, and elementary physics or natural philosophy. This provision will not be required before the close of the lecture sessions of 1882-1883.

#### *II. Branches of Medical Science to be included in the Courses of Instruction.*

1. Anatomy. 2. Physiology. 3. Chemistry. 4. Materia medica and therapeutics. 5. Theory and practice of medicine. 6. Surgery. 7. Obstetrics and gynecology. 8. Hygiene and sanitation. 9. Medical jurisprudence.

#### *III. Length of Regular or Graduate Classes.*

1. The time occupied in the regular courses or sessions from which students are graduated shall not be less than five months or twenty weeks each.

2. Two full courses of lectures not within one and the same time shall be required for graduation with the degree of doctor of medicine.

Our Board will refuse to recognize the diploma of any medical college that does not teach hygiene, after the next course of lectures. We do not care what school it is in the United States. We have decided on that, and this comes from a Board whose action is unanimous.

What I have read is from the proofs of our forthcoming report, which will be sent to the medical colleges when printed, to inform them of our action.

THE PRESIDENT. Does the gentleman desire any action taken?

DR. RAUCH. I have made these remarks simply for the information of the Association.

DR. J. J. SPEED, of Kentucky, read a paper on "Inside Sources of Disease." (See page 272.)



DR. A. J. MILES, of Ohio, read a paper on "The History of Sunstroke Mortality in Cincinnati in 1881." (See page 293.)

DR. J. F. A. ADAMS, of Massachusetts, presented a paper on "Malaria in New England" (see page 168), which was read by the Secretary, and was discussed as follows:—

DR. HENRY F. CAMPBELL, of Georgia:—

MR. PRESIDENT, — The paper just read is certainly one of extreme interest to the practitioner as well as to the sanitarian. I scarcely know whether to discuss it as a pathologist and etiologist or not. I do not know whether that would be in order.

THE PRESIDENT. We are here in the interests of preventive medicine, doctor.

DR. CAMPBELL. I am coming to preventive medicine. But still there are reasonings and discussions and arguments brought forward that are so fully based on etiological ideas,—indeed, preventive medicine is a matter of etiology, and it is impossible to leave it out in discussions of sanitation.

Now twelve years was a very long time for this army of malaria germs to move so short a distance. May it not be that it took the observer that length of time to recognize that it was malaria that was gradually changing the character of the fevers of this region? It is difficult always to understand and interpret the tangled skein of phenomena that presents itself in fever. My explanation of these changes in regard to the types of fever is that gradually the physicians, in the region in which typhoidal diseases had existed, learned the use and efficiency of quinine in the treatment of this disease—in the treatment of the malarial element of this disease.

I believe malaria existed there from the beginning to a certain extent. I believe the fevers of this region, as they are throughout many portions of the South, were from the beginning not strictly typhoidal, but were malarial in their character, and therefore I would challenge and question the opinion that disease had changed its character, and that malaria had appeared so suddenly at this particular date.

I notice, through the journals in northern regions, that of late malaria is spoken of as having recently invaded that country, and that quinine is more abundantly given, and in the "Record" the evil of giving quinine is discussed and deprecated as a great evil coming into the profession and upon the community.

Now my explanation, to be short, of this invasion of malaria in countries where it has never existed before, is simply this: that there existed long before a malarial element blended with the typhoidal affections of these regions, but as the proper application of quinine became more widely understood, these gentlemen began to recognize what was the new element in the disease,—but it was there before. Through all our southern and western country quinine is given in many phases of typhoidal fevers, because at some stage or other the paroxysmal element is recognized. The evening paroxysms, which are called diurnal changes, and not recognized as a part of the disease itself, are really the malarial element of the affection, and hence the very appropriate name recently given by Dr. Woodward, typho-malaria.

It was naming no new disease. It was naming a disease which the profession knew long ago as typho-malaria — part paroxysmal and part typhoidal. The regular beat of ninety marking the typhoid fever in the afternoon hours of the day would rise to say one hundred, and temperature of one hundred would go to one hundred and three in the evening, showing a distinct paroxysm, and making it what in reality it was — a remittent fever and not typhoidal.

Now come to the pathological examinations. It is plain to my mind that the enlargement of the glands, and particularly the laceration of the ileum and the patient dying sometimes, is pretty good proof that it was typho-malarial and not paroxysmal, — they do not die of pure paroxysm when you treat them. They run down, become dropsical, wear out, but they do not die of the disease. They die of wrong treatment sometimes, or in consequence of letting it go on too long ; but you can just stop it with quinine. Every field hand knows about quinine. If they get intermittent fever they take quinine ; they do not send for any doctor. They take it then just as they would take water when thirsty.

My reply to the question of the new invasion of malaria in northern regions is this : It was there before, but not recognized.

THE PRESIDENT. The time of the gentleman has expired.

DR. CAMPBELL. I expect it is just as well.

DR. DEVRON, of Louisiana : —

MR. PRESIDENT, — I have listened with attention to the paper read. I have been led to believe that civilization and population tend to cause the appearance of malaria through closely settled regions. When I reflect on the paper read I can understand how malaria may make its appearance, — when the interests of commerce and manufactures create nuisances which cultivation and civilization have destroyed. Large swamps have been filled by the cultivator ; the sanitarians of the cities clean and drain their streets, but the manufacturer comes to-day and builds up his dams and creates a new source of malaria. The conditions now found in Massachusetts and the New England States generally are most probably the best to obtain the production of the disease. Large establishments, large dams, stopping streams, forming artificial lakes, ponds, are the best things to produce malaria, and I speak knowingly and feelingly of it, as I live in a malarial district, and in the most malarially infected portion of it, — the third district. During the past year New Orleans had every reason to expect a malarial season. Besides the existence of the ponds and ditches and low and dirty places required to produce malaria, something more perhaps existed, the peculiarities of a remarkable season. A tidal overflow also brought into our lake salt and brackish water, and flooded nearly two thirds of the city, remaining on its surface for a number of days, actually flooding its water-closets and spreading their contents over the surface. We all expected a most malarial fever year. But the peculiar conditions were not present, and what has occurred ? My experience — and I think I will be seconded by my colleagues — was, that in twenty years I never saw so little malarial fever. So that the circumstances existing in New England must have been peculiar

to produce this thing. I heard also of fevers having prevailed all along the route as I came through Alabama and into this State, so that the proper circumstances and climatic conditions existed peculiar to the disease in those States at the time.

One thing I cannot understand, not knowing the true conditions, or the grades, or the topography of the country described, how it took months or years for the disease to go from place to place. My experience has been that it does not take long for malarial poison to reach any distance. To give you an idea of the distance to which particle substances can be carried, I will refer to one instance in New Orleans. In certain seasons, after showers, our roofs and cisterns are covered with a powder which looks like sulphur. When you pick it up and examine it you find it is from the pine tree, and we have no pine trees within eighteen miles of New Orleans.

The only way I can explain the slow progress referred to in the paper is by supposing the causes were gradually being created, or that the favoring circumstances did not exist. These particles can be carried a long distance in a short time unless obstructions prevent, — forests for instance.

In New Orleans I made a special examination of the progress of malaria for four years. I marked on the plan of my section of the city, containing forty-five thousand inhabitants, every death from malaria. I discovered that on streets running directly from the swamp to the river, that is, perpendicular to the river bringing the swamp atmosphere and particles directly into the homes of the people without any obstruction, the mortality there was three to one; on the streets running parallel to the river, with intervening trees, etc., only one to three. In other words, three deaths occurred on the perpendicular streets to one on the others. Investigations showed the same results every year. More than that, in 1874 I believe we had the heated term, when people took sick in the morning and died in a few hours. It was all put down to heat. It was called the heated term. From a death-rate of one hundred the mortality rose to two hundred and seventy-four in one week. We had a long dry spell. Fever was prevailing, no yellow-fever, but ordinary malarial fever. I examined those cases in my district. My district runs horizontally — east, and was receiving the sun from morning until night, not a particle of shade. Therefore the horizontal streets were hottest. The perpendicular streets had shade some time during the day and were the coolest, yet the mortality was greatest on the streets running from the swamps.

I thought the increased death-rate was due to the same poison coming from the same direction — its power increased by the heat. (Time expired.)

DR. A. N. BELL, of New York: —

MR. PRESIDENT AND GENTLEMEN, — I am sure, in common with most of you, it has appeared that the particular point in the paper read has taken the form of the fashionable theory or fact, as it may be, that intermittent fevers are propagated by germs. I do not wish to discuss that, but simply to make the point in reference to this stated progress of intermittent fever, almost regardless of local conditions. It is certainly no new fact. It is as old as the history of intermittent fever at least, that to a certain extent,



along banks of rivers, mill-dams, and mud ponds, it can be dammed up. Few of us here but are old enough to understand that. I could stand here and recount from mere recollection where intermittent fever has appeared for the first time in certain places, and show where some stream in the neighborhood has been dammed up, rubbish and vegetation thrown in to rot and decay. Whatever it may be, if it be a live germ, or whether it be some decaying matter, we do know the effect of water upon it is either to dissolve or absorb or carry it away, or by some other means to dispose of it so as to destroy it. We do know that intermittent fever is a poor sailor, that it never crosses broad streams. The man in Central America and other countries, who as night comes on pushes off into the stream, and anchors there until morning, knows he will die if he sleeps on the shore, while he can rest in safety in his boat on the water. Why? This germ, whether it be living or dead, is a poor sailor. It cannot reach him in his boat. The water in some way has had the effect to arrest it.

Intermittent fever, also, may exist where the soil is sandy. Many of us know that in many sandy plains we have seen intermittent fever, particularly and above all, if there happens to be a certain amount of "hard pan" to retain the water.

In the vicinity of New York, on Bay Ridge, from Greenwood to Fort Hamilton, was one of the most malarial regions in the whole country many years ago, but by spending \$18,000 or \$20,000 for draining it was eradicated. The water was retained within four or five feet of the surface. But by draining the water was carried off, and seemed to carry the poison with it and carry it into the river. The merchants all along that region who considered quinine an important article of trade have ceased to keep it for sale, because they say there is no demand for it.

I know something of these local conditions in New England. I have been there a great deal. I have lived there, and I know in reference to some of these very dams and ponds and water sources, how easy it is to make a malarious region, and that it is easier still to destroy it. There is no gentleman within the sound of my voice, not one, who can call himself a sanitarian who would not be ashamed to say he did not know how to get rid of intermittent fever.

We move into some marshy region where cases of intermittent fever occur for the first time. They appear for the first time because people appear for the first time who keep a record of it. So in the settlement of New England. The Indians kept no record of intermittent fever. They could not give us an account of it. But when people of intelligence and observation settled there a record was kept of when it first appeared. Then if they moved away and returned again years after they found these same causes still existing, still ready to make them sick, and especially if, as I said, this "hard pan" soil kept the moisture within the power of the sun's rays, and kept it in such condition that the poison was scattered abroad. Then they would state the disease appeared at such a time, referring to the period when they first settled there, and did not appear again for twenty years, perhaps, the time when they returned.

While I speak without data, yet I speak from long observation. I have but just read the report of the State Medical Society of Connecticut, where Dr. Griswold has made a valuable contribution on this same subject. He sent papers to a large number of physicians asking for their observations in regard to intermittent fever. He has found some of the places where it prevailed were those which at a superficial glance ought to be most free from it. But when he comes to describe conditions of the soil, he says that it is not prone to appear or spread in the marshy regions in particular; but he refers to a kind of marsh which is almost constantly under water. Is there any one who does not know that those are conditions under which intermittent fever is not likely to prevail? Is there any one who does not know that in the condition denominated night air, the poison is most potent, that it lurks along the shore and seems to be arrested by the water? Are there any so little learned in intermittent fever as not to know that the swamps of Canada are the most deadly in the world for intermittent fever. Has it been introduced there? Whether one man or a hundred go there they find the disease ahead of them, whenever the local conditions are favorable.

DR. D. C. HOLLIDAY, of Louisiana:—

MR. PRESIDENT, — Malaria is certainly prevalent in the surroundings of New Orleans, but the city proper cannot be called a region of very great malaria. But, as Dr. Campbell observes, in the prevalence of all diseases we have noted a malarial complication running through them, clearly marked, and giving way to the judicious administration of quinine.

May it not be thought possible that where typhoid fever has originally prevailed, and the causes of typhoid fever seemed stamped out by the progress of hygienic improvement, the malarial complications might still remain and be noted afterwards with the progress or advance of malarial fevers. May that not be the true reason why these places are considered more malarial now than formerly, and the use of quinine has probably come into the general practice?

Again, we find, with regard to malaria in New Orleans, the seasons when very hot and dry are usually the healthiest, notably so this year. We have been exempt to a great extent from the prevalence of malarial fevers during the past summer. As soon as the fall modified the intensity of the heat and the great drought by occasional showers, and the atmosphere became more humid, we at once saw an increase of fevers far greater than we find generally at that season. May not this be from the fact of the diminution of heat and the increase of moisture in the atmosphere?

Again, the gentleman from New Orleans observed that the streets running parallel to the river, and those from the river, presented peculiar and distinct differences in the mortality and prevalence of malarial fevers. The Auxiliary Sanitary Association of our city has adopted a means of establishing a flowing current of water down the streets perpendicular to the water, and washing everything we can suppose to be the cause of malaria back again to the hiding-places of the swamp, and we anticipate the greatest possible benefit from this improved method of hygienic irrigation, or washing out of our city by the best possible means—the flowing current of the river.

Again, as to the prevalence of this feeling of always looking on quinine as a bug-bear, as something to be avoided, as something detrimental to the health. You will find men swallowing fifteen or twenty grains of blue mass and calomel without hesitation, but if you speak of quinine, the effect of which can be but beneficent, they will shrink from it as from the bite of a viper. Of course no medicine should be handled without discrimination and judgment, but every man should be aware of the means, and the potency of the means in his power when called on to combat the inroads of disease.

THE PRESIDENT. Time for discussion has expired.

DR. BELL. Can it not be taken up at some future time? It is an important question.

THE PRESIDENT. I think there will be time on Friday.

HON. ERASTUS BROOKS, of New York, read a paper on "The Duties of the Citizen to the State in Maintaining Public Health." (See page 331.)

The hour for taking a recess having arrived, the Association adjourned until 3 o'clock P. M.

#### AFTERNOON SESSION.

The Association reassembled at 3 o'clock, the President, DR. WHITE, in the chair.

The Secretary, for the Executive Committee, presented the list of names proposed for membership by the Committee, and those named were elected.

A paper, on "The Pernicious Effects of Tobacco on Youths," by DR. ALBERT C. GORGAS, United States Navy, was read by title, by the Secretary. (See page 230.)

The report of the Committee on Vital Statistics, presented by Dr. Elisha Harris, of New York, its chairman, was read by DR. C. N. HEWITT, of Minnesota.

THE PRESIDENT. Dr. Hunt, from the Committee on Statistics, will report the resolutions agreed upon by that Committee, as approved by the Executive Committee.

DR. HUNT:—

MR. PRESIDENT, — The first resolution I will report is the following:—

*"Resolved, That the Executive Committee of this Association is hereby instructed to memorialize, in the name of this Association, the Congress of the United States in favor of such legislation as will bring about a proper coöperation between the General Government of the United States and the several State Governments for a uniform and efficient system of the registry of the deaths, births, and marriages of the population."*

I move its adoption, and in doing so I would state that Dr. Harris is chairman of the committee, and Dr. Snow second, and therefore I am not very familiar with this report. I would advise that the resolutions offered be read seriatim. The one I have read is separate, and was offered in connection with the first report of Dr. Harris, therefore I move its adoption.

The question was taken, and the resolution adopted.

DR. HUNT. I will now read the first three resolutions, as they are linked together, and it would perhaps be well to vote on them together:—



*Whereas*, The American Public Health Association, recognizing the fact that a correct knowledge and use of vital statistics, and especially of the records of mortality and disease, are essential to the science and duties of public hygiene; therefore,

*Resolved*, That this Association fully concurs in the recommendations which have been made at several sessions of the American Association for the Promotion of Science, and at successive annual meetings of the American Public Health Association.

*Resolved*, That the report and papers herewith submitted from the Committee on Vital Statistics be referred to said committee, to revise and suitably present to the Forty-seventh National Congress at an early period of its first session.

*Resolved*, That the National Board of Health is hereby requested to coöperate and lead in the effort to secure uniform results in registration of births, deaths, and marriages throughout the nation; and that said Board is earnestly requested to procure such action of the National Congress, and the adoption of such methods and regulations in all departments of the military, naval, and civil service, as should be enforced by national laws and regulations.

The question was taken, and the resolutions adopted.

The remaining resolutions were read separately and adopted as follows:—

*Resolved*, That accurate and faithful registration of deaths and the causes of death should be enforced in every State and Territory under suitable statutes, by local and State Boards of Health, or, at least, under the immediate supervision of such boards.

*Resolved*, That by whatever methods the most complete and perfect registration may be secured in the respective States, the results of such registration should present the vital statistics of the people complete and readily comparable under each and all branches, that such uniformity of results may constitute the uniformity of system which this Association asks for in the name of the States and the nation.

*Resolved*, That the several State Boards of Health are respectfully urged to do whatever they can to promote the completeness and uniformity of registration in vital statistics of the respective States, and that in order to promote their effectual coöperation copies of this report be placed in the hands of each of the State Boards of Health, and also be transmitted to each of the governors of the States and Territories.

*Resolved*, That the American Public Health Association's Committee on Registration and Vital Statistics is hereby directed to continue its duties under the Association, and to coöperate with the National Board of Health as opportunity is afforded to promote the desired action of the State and national legislatures and of the Boards of Health.

The Treasurer, DR. J. BERRIEN LINDSLEY, of Tennessee, then submitted his report for the year, as follows:—

## ANNUAL REPORT OF DR. J. BERRIEN LINDSLEY, NASHVILLE, TENN., TREASURER OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NOVEMBER 29, 1881.

*Receipts.*

Balance brought forward . . . . .	\$705.00
Received from sale of "Public Health" . . . . .	98.00
Received for dues from members as per list in my hands, and per Treasurer's book . . . . .	2,640.00
	<hr/>
	3,443.00

*Disbursements.*

Paid for stationery, printing, and other office expenses of Sec- retary, Treasurer, and President . . . . .	428.52
Paid for called meeting of Executive Committee, June 21, 1881 . . . . .	75.00
Paid on account of former volumes . . . . .	95.55
Paid for printing, binding, and mailing Vol. VI. . . . .	2,031.26
Balance on hand . . . . .	812.67
	<hr/>
	\$3,443.00

The report was referred to an auditing committee, consisting of Dr. H. B. Baker, of Michigan, Dr. Gustavus Devron, of Louisiana, and Dr. R. Rutherford, of Texas.

DR. H. ISAAC JONES, of Pennsylvania, read a paper on "School Hygiene." (See page 241.)

The paper of DR. LOUIS A. FALLIGANT, of Georgia, on "Fraternity among Scientists," was read by title by the Secretary.

DR. GUSTAVUS DEVRON, of Louisiana, read a paper prepared by the President, DR. C. B. WHITE, as Sanitary Director of the New Orleans Sanitary Auxiliary Association, on "The Yellow Fever Epidemic of 1878." (See page 201.)

DR. A. R. WRIGHT, of New York, read a paper on "The Probable Cause of an Epidemic of Diarrhœal Diseases in Buffalo, N. Y., in August and September, 1881." (See page 212.)

DR. MOSES T. RUNNELS, of Indiana, read a paper on "Impure Water and its Dangers." (See page 283.)

The paper of DR. T. C. DUNCAN, of Illinois, on "The Atmospheric Element in Local Epidemics," was read by title by the Secretary. (See page 214.)

The PRESIDENT then introduced DR. F. PEYRE PORCHER, of South Carolina, as the representative of His Excellency, Governor Hagood. Dr. Porcher said:—

MR. PRESIDENT, — I beg leave, in the name of His Excellency the Governor of South Carolina, to express his regrets to this Association that he is unable, on account of public business, to be present at this meeting. He feels deeply concerned in the prosperity of the Association, and he hopes that you will do him the honor on some future occasion to meet at his capital. He has done me the distinguished honor to permit me to represent him on this floor.

The PRESIDENT then introduced DR. J. D. GATCH, of Indiana, the representative of His Excellency Governor Porter, of Indiana, who said : —

MR. PRESIDENT AND GENTLEMEN, — Governor Porter has been very kindly invited by your Secretary to attend the present session of the Association. The Governor would have been pleased to avail himself of that invitation, but for want of leisure is not able to do so. In behalf of Governor Porter I extend to the Association Indiana's greetings, wishing you God-speed in your good, grand, and noble work.

Mr. President, Indiana is doing well. She has come to the front. Our last Legislature enacted a law providing for a State Board of Health, vesting the appointing power in the hands of the Governor, which duty he has performed, appointing five of our able men on that board. The president of the board, Dr. Compton, is present. Permit me to say, also, that we have had the honor of handing the Executive Committee an invitation from his excellency to the Association to hold its next annual session at Indianapolis. If the Association avail itself of that invitation, we shall see that every facility which can tend to its happiness and prosperity will be extended.

The Association then took a recess until 7.30 o'clock.

#### EVENING SESSION.

The Association was called to order at 7.30 by the Secretary, who said : —

MEMBERS OF THE ASSOCIATION, LADIES AND GENTLEMEN, — I have the pleasure of introducing to you Colonel E. C. Anderson, who will preside over your deliberations this evening.

COLONEL ANDERSON took the chair.

DR. S. S. HERRICK, of Louisiana, read a paper on "Railroad Sanitation." (See page 218.)

DR. B. JOY JEFFRIES, of Massachusetts, read a paper on "The Control of Defective Vision by Land and Sea." (See page 225.)

DR. A. L. GIHON, of the United States Navy, read a paper on "Health the True Nobility." (See page 342.)

There being no further business, the Association adjourned until Thursday, December 1, 1881, at 9.30 o'clock.

#### THURSDAY, DECEMBER 1, 1881.

#### MORNING SESSION.

The Association reassembled at half-past nine o'clock.

The Second Vice-president, DR. CAMPBELL, in the chair. Prayer was offered by the Rev. W. S. BOWMAN, D. D., of Savannah.

The PRESIDENT. The Executive Committee not being ready to report, the first paper is now in order.

DR. D. M. BURGESS, of Havana, Cuba, read a paper on "Practical Experiences in Regard to the Infection of Vessels with Yellow Fever in the Port of Havana." (See page 205.)

The PRESIDENT. The Advisory Committee is now ready to report.



THE SECRETARY: I am directed by the Advisory Council, acting as a nominating committee, and charged with the duty of reporting at this hour, to present the following nominations for officers for the ensuing year: —

*President.* — Prof. R. C. Kedzie, of Michigan.

*First Vice-president.* — Dr. Ezra M. Hunt, of New Jersey.

*Second Vice-president.* — Dr. Albert L. Gihon, of United States Navy.

*Treasurer.* — Dr. J. Berrien Lindsley, of Tennessee.

*Executive Committee.* — Dr. James E. Reeves, of West Virginia; Dr. Stephen Smith, of New York; Dr. Thomas L. Neal, of Ohio; Dr. J. G. Thomas, of Georgia; Edward Fenner, Esq., of Louisiana; Dr. John H. Rauch, of Illinois.

DR. BELL, of New York: —

MR. PRESIDENT, — I move that the Secretary be instructed to cast the ballot of the Association for the nominees.

The motion was agreed to.

THE SECRETARY: —

MR. PRESIDENT, — I have thrown a ballot for the officers, as nominated by the Advisory Council, bearing the names of each as read.

The President declared the gentlemen whose names had been read elected to the offices for which they were respectively named.

DR. GIHON, United States Navy: —

MR. PRESIDENT, — I have a resolution to offer, which I wish to be referred to the Executive Committee. I may say, in offering these resolutions, this Association is neglecting a serious responsibility. It seems to have forgotten that it has a child, and it is letting that child go without proper consideration and thought as to its future. The child I refer to is the National Board of Health. I am not quite sure that the child itself has not forgotten its own father and mother. Nevertheless in a short time the life of the National Board of Health will come to an end unless we do something to continue it. The resolutions are as follows: —

*Resolved,* That it is the opinion of this Association that the usefulness, powers, and influence of the National Board of Health will be materially advanced by re-constituting it, as a representative body to be composed of representatives from the several State Boards of Health, the medical department of the United States army and navy, and the United States Marine Hospital Service.

*Resolved,* That a committee of delegates, to be nominated by the several State Boards of Health, army, navy, and Marine Hospital Service, in the proportion of one from each, be instructed to consider, without delay, the best manner of making known to the Congress of the United States the opinion of the Association to accomplish this result.

The resolutions went to the Executive Committee under the rule.

The Secretary laid before the Association invitations from the cities of Indianapolis, Cleveland, and Detroit, each requesting to have the next meeting of the Association, and said: —

MR. PRESIDENT, — I am directed by the Advisory Council to present its recommendation that the Association accept the invitation of the Gov-

ernor and people of Indiana to hold its meeting for 1882 in the city of Indianapolis.

DR. TADLOCK, of Tennessee : —

MR. PRESIDENT, — I have an invitation from Knoxville, Tenn., I want to present to the Association. I bear a hearty invitation from the Mayor and Aldermen of Knoxville, requesting your meeting to be held there next year. I shall not read it, but it will be referred to the proper committee. I also have that supplemented by a hearty invitation from the Medical Society of Knox County ; also by an invitation from the Board of Health of Knoxville ; also by a hearty invitation from the people of Knoxville. It is signed by the leading men of the city of Knoxville and by nearly all the merchants, covering four pages of legal cap. Besides, I bear a letter from the Old Dominion Steamship Company, stating it will furnish transportation at a very low rate with cheerfulness, and also from the Norfolk and Western Railroad, extending the same privileges. I also have a verbal communication from Knoxville Railroad Company to the same effect. If I could say more I would. You know we are a live town ; we have a healthy city, and you know she is interested in the Association, because she sends here more delegates to this convention than any other city of her size in the Union. We are represented by thirteen or fourteen members, and three or four are ladies, and I dare say there is not a city in the Union will turn out such a representation as that at this meeting.

DR. HUNT, of New Jersey : —

MR. PRESIDENT, — I move this whole matter be referred back again to the Advisory Committee, in order that it may consider this new invitation and any others that may arrive. I consider the place of meeting as important a question as any that can be brought before the Association.

THE SECRETARY : —

MR. PRESIDENT, — I should not do justice to the Advisory Council if I did not say there was first a vote to go to some other place than Indianapolis, but it was reconsidered, and the vote of the Committee was unanimously in favor of Indianapolis.

DR. HUNT, of New Jersey. Knoxville was not before the Committee.

THE SECRETARY : —

MR. PRESIDENT, — We were at Nashville a few years ago ; and Indiana, which has just formed a State Board of Health, needs our influence.

DR. TADLOCK, of Tennessee : Well, Mr. President, we will not press our invitation this year, because we think it is for the Association to select a place which will contribute most to its prosperity, but we will claim your attention at some future time.

DR. FOOTE, of Illinois : —

MR. PRESIDENT, — I move we adopt the report of the Advisory Committee to meet next year at Indianapolis.

THE PRESIDENT (Dr. Campbell in the chair) : While we appreciate the hearty invitation coming from Knoxville, we cannot alter the determination of the Advisory Council. The question is on the adoption of the committee's report.

The question was taken and the report adopted, and the Association selected Indianapolis as its next place of meeting.

DR. PLUNKETT, of Tennessee:—

MR. PRESIDENT,—I offer the following resolution, and in doing so, I wish to state that Tennessee is without voice in this Association, notwithstanding we have twenty-five or thirty delegates on the floor:—

*Resolved*, That for the future the Advisory and Nominating Committee of this Association be constituted as follows: The delegates present at this meeting from each State shall select one of their number who collectively shall constitute the Advisory Committee.

THE PRESIDENT: The resolution will be referred without debate.

DR. PLUNKETT, of Tennessee: In the future I wish it arranged so that each State will have a voice in the selection of officers, and such other proceedings as are now conducted in this star chamber—Advisory Committee.

DR. J. H. LETCHER, of Kentucky:—

MR. PRESIDENT,—I will state I have a report on "Compulsory Vaccination and Revaccination," but as the time for adjournment is near, and I propose to leave the city this evening, I would like to refer it by title, and offer some resolutions for reference to the Executive Committee.

The resolutions are as follows:—

*Resolved*, That this Association, through its Committee on Compulsory Vaccination and Revaccination, ask all State Medical Societies and State Boards of Health to endeavor, as far as possible, to procure the enactment of laws in their respective cities, counties, and State, compelling vaccination and revaccination.

*Resolved*, That the American Public Health Association be asked to render its aid and influence in the furtherance of compulsory vaccination and revaccination.

*Resolved*, That the Governor of each State in the Union be communicated with concerning this matter, with the request that in his next annual message to the law-makers he call their attention to the importance of the speedy enactment of laws touching this question.

*Resolved*, That the United States Government, through its chief magistrate, have its attention directed to the need of a national law on compulsory vaccination and revaccination, and at all events that it be advised of the importance of compelling all foreigners who come to make their homes with us, unless they can give proof of successful vaccination, to be vaccinated immediately on their arrival here.

The resolutions were referred to the Executive Committee, under the rule.

The papers of DR. F. F. DEARING, on "The Preservation of Forests," and DR. EUGENE FOSTER, of Georgia, on "Sanitary Organization," were read by title.

THE SECRETARY:—

MR. PRESIDENT,—I have to announce on behalf of the Executive Committee, that it has been unable to act on the names presented for membership on account of the protracted meeting of the Advisory Committee, but its action will be submitted at the evening session.



The Secretary gave notice of a meeting of the Committee on Necrology. On motion of the Secretary, the Association adjourned until 7.30 P. M., to participate in the excursion to Tybee.

EVENING SESSION.

The Association met, pursuant to recess taken, at 7.30 P. M.

THE SECRETARY: I have the pleasure of introducing as the presiding officer of the evening, General Henry R. Jackson, of Savannah.

GENERAL JACKSON took the chair.

The Secretary, for the Executive Committee, presented the list of names prepared for membership by the Committee, and those named were elected.

DR. E. M. HUNT, of New Jersey, read a paper on "The Sanitary Significance of the International Medical Congress." (See page 353).

EDWARD FENNER, ESQ., of Louisiana, read a paper on "The New Orleans Sanitary Association." (See page 91.)

The Secretary stated there were several matters of general business now to be brought before the Association.

The paper of DR. JOHN T. NAGLE, of New York, on "Statistics of Suicide in New York, from 1870 to 1881," was read by title. (See p. 247.)

MR. FENNER, of Louisiana, from the committee charged with the consideration of the questions relative to the hog and cattle diseases, submitted a preliminary report, with a resolution, as follows:—

MR. PRESIDENT, — Your committee charged with the duty of considering the questions presented by the papers on hog and cattle diseases, and on questions relating thereto, beg leave to make this, their preliminary report.

First. That while we deprecate all attempts to magnify the extent and danger of animal disease, we believe that the proper protection from inexact and sensational reports is to secure official facts as to the extent and limitation of all these diseases.

Second. That we appreciate the important work which has been done by the agricultural department in this direction, but urge still more accurate and extended investigation into the causes and modes of prevention of infectious diseases of animals; and finally

*Resolved*, That a committee of five be appointed by the chair to urge upon Congress the importance of a fuller investigation of the communicable diseases of animals, and the importance of affording the department the necessary means to carry on this research.

EDWARD FENNER, *Chairman*.

J. M. PARTRIDGE.

E. M. HUNT.

JOHN H. RAUCH.

On motion, with the concurrence of the Executive Committee, the resolution was adopted.

THE SECRETARY:—

MR. PRESIDENT, — I am directed by the Executive Committee to submit for vote the following resolutions, which were offered by the Committee

on Compulsory Vaccination in the early part of the day. The Committee makes no recommendation.

*Resolved*, That this Association, through its Committee on Compulsory Vaccination and Revaccination, ask all State medical societies and State Boards of Health to endeavor as far as possible to procure the enactment of laws in their respective cities, counties, and States, compelling vaccination and revaccination.

*Resolved*, That the American Public Health Association be asked to render its aid and influence in the furtherance of compulsory vaccination and revaccination.

*Resolved*, That the Governor of each State in the Union be communicated with concerning this matter, with the request that in his next annual message to the law-makers he call their attention to the importance of the speedy enactment of laws touching this question.

*Resolved*, That the United States government, through its chief magistrate, have its attention directed to the need of a national law on compulsory vaccination and revaccination, and at all events that it be advised of the importance of compelling all foreigners who come to make their homes with us, unless they can give proof of successful vaccination, to be vaccinated immediately on their arrival here.

DR. HEWITT, of Minnesota : —

MR. PRESIDENT, — I move they be laid on the table.

The question was taken and decided in the negative, and the Association refused to lay the resolutions on the table.

DR. HUNT, of New Jersey : —

MR. PRESIDENT, — I desire to say that although I voted "No" on the motion to lay the resolutions on the table, I think we should make haste slowly in adopting them. I am not ready to vote for their adoption, but yet I was not willing they should be so summarily disposed of. It seems to me that the whole question of compulsory vaccination in this country needs to be canvassed closely. It is a matter which can be adopted in certain States. It is a proposition which would not meet with acceptance in some other States, and would retard vaccination. There are other methods of getting at vaccination. For instance, where we make it obligatory on every person attending school to be vaccinated, it accomplishes a great deal. There are other points which, if there were time for discussion, might be raised, and I hope that some suggestion will be made as to the disposition of these resolutions which on the one hand will not adopt and on the other will not so summarily dispose of them as a motion to lay on the table. Perhaps it would be in order to make as an amendment a motion that these resolutions be deferred until next year in order that we may have time to more thoroughly think them over. I wish something might be done in order to get an exact and thorough report on this subject, we have so much to learn on it ; and therefore I would make this motion merely to test the general feeling of the Association.

DR. BAKER, of Michigan : —

MR. PRESIDENT, — I wish the resolutions could be referred to a special committee to report at next meeting. I dislike to vote it down, but I shall be obliged to vote "No," if it is pressed to vote now.

THE SECRETARY : It is the report now of a special committee. Does the gentleman wish it recommitted ?

DR. BAKER : I want a report from the committee giving the reasons for the faith that is within them.

DR. HEWITT, of Minnesota : —

MR. PRESIDENT, — I do not believe there is anything to be gained by refusing to discuss the matter. The gentlemen who have spoken represent two States, and I represent another State which is now fighting with small-pox, namely, Minnesota. We have it in different parts of the State brought from other parts of the country. Our Legislature was in session before I came down here. When I came from the infected locality to the capital of the State, I was told that a compulsory vaccination law had been prepared, and the Legislature was ready to pass it if it was approved of, and I was asked to make some suggestions. I asked them to table the whole matter.

Now I do not want this Association to pass a resolution which is going to hamper us in the field, fighting the thing this is aimed at. Those of us who are fighting small-pox practically, those of us who are dealing with it, ought to be heard calmly and dispassionately before the Society acts, because a great deal of the action taken here may embarrass those of us who are trying to make hygiene practical. It is one thing to come with a series of resolutions that seem to cover a great amount of ground, it is another thing to take practical charge of that work and go into a district and carry out the instructions of this Association.

I opposed compulsory vaccination in Minnesota when I might have had a law for it, because it is a great deal easier to persuade a man in an emergency to take a course of safety than it is to take a club and drive him. Our people — and I suppose we are not different from any other people — are open to conviction under such circumstances. I found that I needed no law whatever to secure vaccination wherever I went. Vaccination can be enforced in the public schools ; physicians have it in their power to secure vaccination in the confines of the families they attend, and it is only in great emergencies we are called on for wide-spread vaccination. It is a delicate matter for those of us who have to insist on it to have the matter opened for arbitrary legislation, or attempts at legislation. It is an unwise thing to do. This Association should go slow before it acts. I do not want to hurry the matter. It is too important. Those of us who are fighting the disease know how important. But do not embarrass us in our work by any Utopian schemes.

Stop a moment and consider. Suppose in Minnesota I was compelled to carry out the behests of this Association — how could I go about it. Imagine what method of procedure I would take to secure the absolute arbitrary vaccination by law of every person in one township, and carry that act over the State. I cannot conceive of any way in which it could be enforced compulsorily, without awakening such a storm of indignation as to induce many persons who would concede the necessity of it to resist it.

There is another view of the matter which I do not know whether the committee considered or not. We find among a great many thinking people of this country there is a great fear of vaccination. You may explain it as you please ; it appears to us absurd ; but we meet it nevertheless. I met it, met it in places least expected. I found opposition cropping out



where I least thought I should find it. Therefore any attempt to legislate is going to develop this, and the opposition, now spasmodic, will become united, and the difficulty with which we now contend increased.

I think Dr. Baker's proposition, if anything is to be done about it, better be adopted. What is the sense of persuading people A is A and B is B by compulsion? If it were a new subject, something on which anything new had been discovered since Jenner, it would be a different matter. All you will do will be to open up the question whether vaccine matter will convey disease. You are going to start an interest among people now uninterested which will result in evil. I speak strongly because I feel strongly, and because I am trying to work strongly in fighting the disease in my locality, and I believe I express the feeling of other executive officers here.

DR. HUNT, of New Jersey : —

MR. PRESIDENT, — I withdraw my suggestion and second Dr. Baker's motion. It seems to me proper that a committee should be appointed.

DR. BAKER, of Michigan: I wish that committee would take into consideration the difference between a question in sanitary science and one in social science, and see whether there is not a better way to accomplish the object sought than the one suggested.

DR. CAMPBELL, of Georgia (in the chair) : I do not wish that committee to be dissolved. It has the whole thing in charge. I think some attention has got to be paid to this apprehension about vaccination. This apprehension was at first confined to the lower classes, but the more intelligent persons have become anxious about it, not that they are afraid of receiving cattle diseases in the ordinary ignorant fear people formerly had of vaccination, but they are afraid of other disease being transmitted.

Now, this committee having charge of this question, and having charge of the instructions not only of the ignorant who formerly fought vaccination, but of the higher classes, the way to overcome their opposition is to assure them of the purity of the vaccine matter. Then being well persuaded that vaccination does stamp out small-pox, that they dread so much, they will be dissatisfied no longer, but will join us in leading the others, and every one will submit to vaccination.

I advocate the idea strongly that this Association should take up this subject. The very best people have this dread of vaccination. I know in my own community no one will allow an ordinary city vaccinator to vaccinate them; among certain families none but the family physician is allowed to do the vaccinating, and then the people almost make him go down on his knees and swear the vaccine matter is pure. We have not only to deal with the ignorant — why one man said he did not want to be vaccinated because he never heard of a President of the United States being vaccinated — but the most intelligent, and this gives greater significance to the matter. Among them we have to demonstrate that the vaccine is to be pure, and then it will be universally accepted.

DR. DEVRON, of Louisiana : —

MR. PRESIDENT, — If the adoption of the resolutions as read were to obtain immediate legislation either from the United States or the various

State Boards, I would have no objection to putting a year's delay to this action. But if we adopt these resolutions to-day, we will not see them adopted by the authorities for one year, or two years, or three years perhaps. Furthermore, the great effect of our indorsing the means of preventing that preventable disease, small-pox, should not be neglected by this Association. It is in the various States that the methods and rules under which this compulsory vaccination is to take place, should be fixed, but let the principle be announced from this body that it is desirable that compulsory vaccination should take place to prevent the spread of that preventable and horrible disease — small-pox.

DR. COCHRAN, of Alabama : —

MR. PRESIDENT, — I do not desire to discuss the subject at any length, but three representatives of State Boards of Health having already spoken in opposition to the adoption of these resolutions, I, representing the State Board of Health of Alabama, desire to say that I think their passage unadvisable. If this Association desires simply to indorse the doctrine of vaccination, let them pass a resolution to that effect. I shall have nothing to say against it. If any member of this Association has any opinion with reference to vaccination which is not already the common property of the country and the world, let him present that opinion, and I shall be glad to receive it; but I cannot see the propriety, and I cannot see that any good will result from passing a set of resolutions, simply urging on State Legislatures and State Boards of Health to go to work and have laws passed in their respective States for compulsory vaccination. I take it for granted that the various State Boards of Health are quite as able to advise legislatures of States what is to be done. I think the Board of Health of Alabama is quite competent to dispose of this question, so far as Alabama is concerned, without any advice from the American Public Health Association. I think the members of that body know as much about this subject as the members of this. I think they know a great deal more about the wants of their people. This question has been before our State Board of Health time and again, and we have always laid it aside as not seeing how we could move with regard to it for the benefit of our people. And as one of the gentlemen has already said, we do not need a compulsory vaccination law in Alabama any more than in Minnesota.

We are not fighting small-pox in Alabama now, but a few years ago we did have to fight an epidemic of small-pox in the largest city in Alabama, and without any law for compulsory vaccination. Without one particle of power of that sort we accomplished, so far as I know, what has never been accomplished before anywhere; we took an epidemic of small-pox at a time most favorable for its spread, and we stamped it out.

If we can do that in Alabama without any law for compulsory vaccination, I do not see why we should trouble ourselves, I do not see why this Association should trouble itself, to give this sort of gratuitous and uncalled-for advice. If any special scheme of law were presented, with any special favorable features to recommend it, it might be worth while to present it, but simply a set of empty resolutions of views will do no good, they cannot

possibly do any good, and it is no kind of credit to this Association to have them passed.

DR. FALLIGANT, of Georgia: I am not prepared, as yet, to indorse so sweeping a recommendation for compulsory vaccination. My friend Dr. Campbell has already alluded to the general apprehension concerning the transmission of disease from one person to another by the medium of vaccination; and I may express my own apprehension as to the possible conduction of disease from animals into the human body by the medium of bovine virus.

Not many years since, during the existence of considerable small-pox in Savannah, I vaccinated a patient with bovine virus obtained from a prominent establishment for its generation, and there appeared on his arm a jagged yellow incrustation, without pustule or pit, having no property or appearance of vaccination about it. I mention this fact to illustrate how careful a physician must be in selecting virus for this purpose. For my own part, when I know the family history as sound, I prefer to secure a good scab from a child of this household, when the child was vaccinated with pure or bovine virus, and to make my successive vaccinations from the scab thus secured. They will almost always prove successful and free from associated local or general disturbances.

DR. HUNT, of New Jersey:—

MR. PRESIDENT,—Has not our discussion taken too wide a range. I hope we will confine ourselves closely to the question of the resolutions, and to the proposition of the committee, in discussing the whole subject. Let the people have our matured views, and not the mere general views of Messrs. A, B, or C. Let us confine ourselves closely to the question, whether it is worth while to appoint a committee for the year to work up the matter, and give us liberty to study the question, that we may deal with it with more exactness.

DR. C. W. CHAMBERLAIN, of Connecticut:—

MR. PRESIDENT,—I wish to say but a word on the subject, as we have been fighting small-pox in Connecticut for the last two or three years, and very successfully. There is no law necessary for compulsory vaccination there. As Dr. Campbell has said, there is a growing distrust among the better classes, not only fear of vaccination, but a distrust as to its preventive power, which any attempt at compulsory legislation would strengthen. Just as soon as small-pox appears in a neighborhood, the fear of it is sufficiently great to drive every one unprotected to vaccination. We have had in the last three years small-pox introduced into sixteen places, and in only three has there more than one case followed from the first, which shows that the vaccination has been thorough.

In our city we have vaccination by municipal action—the city vaccinator going about from house to house and from school to school. There is no compulsory vaccination, but all those who submit are vaccinated. I approve of the resolution requiring more information on this subject. We are so educated in Connecticut that no one will accept of anything but the bovine virus. I do not think any other has been used for the last four or



five years. The only bad results ever following have been one or two cases of erysipelas. Whether it was due to the virus or the peculiar constitution of the children, it is difficult to say. I think very probably the latter. But in compulsory vaccination any unfortunate circumstance would raise difficulties.

THE SECRETARY : —

MR. PRESIDENT, — The motion before the Association, as I understand it, is the motion of Dr. Baker, of Michigan, to commit to a committee. It cannot be done in that way. This is a report from a special committee. It will be necessary to accept the report — not adopt it — which discharges the committee ; then appoint another ; or else recommit to the present committee. Before we take a vote I suggest the motion be changed in some way so as to make it proper to vote on.

DR. J. G. THOMAS, of Georgia : —

MR. PRESIDENT, — I have no idea Dr. Baker desires to overslaugh or show any disrespect to this committee, and I am in favor of recommitting the report. We will have to go slow in these matters. Individually I am in favor of the most rigid sanitary laws that can be passed, giving power to do anything that can constitutionally be done. But in this country, where liberty is a catch-word, we cannot go as fast as they can in the old country. And, as has been remarked, just such laws as here proposed have been the means of arousing opposition to vaccination.

Now I doubt very much whether a law can be passed compelling people to be vaccinated. I am in favor of it if it can be done. No one advocates vaccination more strongly than I do. We have had epidemics here which proved practically to me the results of vaccination. I believe if the matter is intelligently conducted the minds of the people can be disabused of these fears they have. I think, if these are views of the committee after mature reflection, another committee should be appointed, without intending any disrespect to the present one, so that the question can be brought forward in some other shape.

THE SECRETARY : —

MR. PRESIDENT, — The fact is, the committee, although created at the last session of the Association at New Orleans, escaped the notice of the presiding officer, and was not appointed. It was only some six months later that the Secretary discovered that the motion had been made, and called the attention of the President to the matter. Then quite a time was occupied in finding whether Prof. Chandler, of New York, would accept a position on the committee, as it was desirable to have New York represented. Prof. Chandler finally decided not to accept, and it was not until within three months that the vacancy was filled at all, only to be vacated shortly after. So that the committee has not had a chance to work. Dr. Letcher, the chairman, is the only man on the committee who has really had any opportunity to do anything. There has never been a meeting of the committee, I believe, unless held here. The committee felt it was necessary to make some report, and it is that which is before you. I say this in justice to the committee, who have been acting under unfavorable circumstances.

DR. BELL, of New York : —

MR. PRESIDENT, — I rise to a parliamentary question, that you must re-commit this report to the same committee, or accept the report and appoint another new committee. I suggest the difficulty be solved by recommitting the report and enlarging the committee.

DR. BAKER, of Michigan : —

MR. PRESIDENT, — I wish to support that view of it, particularly as the members of that committee are not present, and with the permission of the Vice-president, who supported my motion, I would like to withdraw it for the purpose of moving the report be accepted, with thanks, and then recommitting, with instructions to report at the next meeting of the Association, and to give their reasons, in order to give a starting-point for discussion.

DR. BELL, of New York : I second the motion, and I wish to state, as one not belonging to a State Board of Health, the reason why I am in favor of continuing the subject for another year. While as one individual I am in favor of compulsory vaccination, I am not ready to vote for it for a reason that has not, I believe, been emphatically assigned here to-night. I appreciate, possibly from a standpoint as good as that of these gentlemen connected with the State Boards of Health, that there is an important movement (we will not discuss the character of the gentlemen engaged in it) opposed to vaccination. There is a society of that kind, I believe, formed in New York. It has some energetic advocates. I do not believe there would be any such effectual way of stimulating the strength of that opposition to vaccination, I will not say to compulsory vaccination, as for us to adopt, prematurely, any resolution for compulsory vaccination. Whatever may be the necessity, as may hereafter be shown by those gentlemen to whom these resolutions have been recommitting — and I hope they will show strong reasons — for compulsory vaccination, we must take cognizance of the arguments used against it by those who oppose it.

I recognize that we have learned very little new about vaccination, except this point : the necessity of keeping it constantly before the people. It should go abroad that this Association has taken the subject up ; that it is concerned in it ; and that it has a standing committee to keep before the public, as well as the profession, the reasons why everybody should be vaccinated in some way or another ; and for the reason, I believe, in some communities — it may not be in Minnesota, it may not be in Alabama, it may not be in some other States, — but there are communities in which it is impracticable to get vaccination without some compulsory law. And for the reason I have stated I wish to see the subject committed to an intelligent committee, as I believe this one to be, that we may have reasons given for the report submitted.

DR. PLUNKETT, of Tennessee : —

MR. PRESIDENT, — Is it in order to amend the motion ? I think it is desirable to enlarge the committee in order that all the different views expressed may be represented on it.

A MEMBER : I rise to inquire if there is not a report accompanying these resolutions. I understood the chairman had a report written out and accompanying these resolutions.

THE SECRETARY: None has reached me. I think he did say, a day or two ago, that he had a partial report prepared, but as he was going to leave he would put in a synopsis and forward something more later, but whether in the shape of a report or not I cannot say.

The motion of Dr. Baker to recommit was agreed to.

THE SECRETARY: The Association has received official notification from the State Board of Health of Indiana of its formation and complete organization.

The Secretary read a communication from the publisher of "The Index Medicus," and also requested representatives of State Boards of Health present to leave at the Secretary's desk memoranda relative to the respective organizations, amounts of money appropriated, etc.

The papers of DR. H. B. HORLBECK, of South Carolina, on "Scarlet Fever in Charleston in 1881" (see p. 291), and of DR. R. B. S. HARGIS, of Florida, on "Diseases of Children due to Dentition," were read by title.

THE SECRETARY: I am directed by the Executive Committee to report the following resolution, with the recommendation that it pass:—

*Resolved*, That in the judgment of the American Public Health Association our National Congress should take some method to determine methods of testing visual acuteness and color blindness, and standard requirements of these necessary qualifications in the navies and merchant marines, as well as on all public highways.

The question was taken, and the resolution adopted.

THE SECRETARY: Also the following resolutions of Dr. Gihon, with the recommendation that as no part of the present organization of the National Board expires for some time after the Indianapolis meeting in 1882, the resolutions do *not* pass:—

*Resolved*, That it is the opinion of this Association that the usefulness, powers, and influence of the National Board of Health will be materially advanced by reconstituting it, as a representative body to be composed of representatives from the several State Boards of Health, the medical department of the United States army and navy, and the United States Marine Hospital Service.

*Resolved*, That a committee of delegates, to be nominated by the several State Boards of Health, army, navy, and Marine Hospital service, in the proportion of one from each, be instructed to consider, without delay, the best manner of making known to the Congress of the United States the opinion of the Association to accomplish this result.

DR. CHANCELLOR:—

MR. PRESIDENT,—I move that the resolutions be substituted for the report of the Committee.

THE SECRETARY:—

MR. PRESIDENT,—That motion necessitates my saying, in behalf of the Executive Committee, that they carefully considered the subject matter of the resolutions. It is a fact that very many are in error as to what the life of the National Board is. Very likely the mover of the resolutions, although I cannot say it positively, shared this error. There is a general supposition that the National Board of Health expires—its organic act



expires soon. That is not so. It is a permanent institution, and it was thought likely by the Executive Committee that this motion would not have been made had the facts been thoroughly understood. There seems to be no reason why, in view of the very great work it required on the part of this Association to establish it, we should run the risk of losing what National Board we have and of not securing any other by attempting to get such a measure as this passed by Congress. If there were a legal lapse of life in the organization of that Board, and it was found defective in structure, there could be no objection to suggestions of this kind. But as the fact is the Board does not expire, and the difficulty of securing it was great, and in all probability the difficulty of getting anything better would be much greater, it is thought best by the Executive Committee to recommend that nothing be done in the matter at least until the next meeting of the Association.

DR. DEVRON, of Louisiana : —

MR. PRESIDENT, — As a friend of the National Board of Health I cannot be misunderstood in asking that the resolution be carried out. I ask it because it meets with the views I have expressed in a letter addressed to the Association at the Nashville meeting ; it would create a representation which would allay and soothe all contentions between State and National Boards. Those resolutions do not cover the point as I would wish them, yet they come sufficiently close to enable me to indorse them. The members now forming the National Board of Health are themselves more or less included in the resolutions as part of those who shall form the new Board of Health, and no doubt when the law is carried out will be its executive officers, for we cannot expect that the representatives of each State would reside all the year round at Washington. We shall have those gentlemen meeting like Congress to pass rules and regulations for the maintenance and regulation of quarantine the country over, but they will require a permanent executive body who have experience in the matter, and none more experienced can be found than those now there at the headquarters, costing the government nothing, because they are already in its employ, namely, the officers of the army, navy, and Marine Hospital Service.

With these facts before us, our motive in passing such resolutions cannot be looked on as an insult to the present Board, or a desire to shorten its life. On the contrary, the experiment has been tried, — for the present Board is nothing but an experiment, — and found successful, and these resolutions are simply to perfect its organization.

DR. C. W. CHANCELLOR, of Maryland : —

MR. PRESIDENT, — I do not desire to interfere with the operations of the National Board of Health, but the Secretary of this Association must have had some information from the gentleman who offered the resolutions when he attempts to say that he offered them without knowing what he was doing.

THE SECRETARY : If the gentleman will allow me. I did not so state. I stated it was possible he was in error, although I had no knowledge on the subject.

DR. CHANCELLOR, of Maryland: Then I hope the gentleman who offered the resolutions will state whether they were offered in good faith or only done for the purpose of indorsing the National Board of Health in a manner that possibly all of us here would not desire to do. I would like to hear from the gentleman, if he is present.

THE SECRETARY: Dr. Gihon is not present.

DR. HEWITT, of Minnesota: He understood these resolutions were not coming up until morning.

DR. HUNT, of New Jersey: It is proper to postpone them.

DR. CHANCELLOR, of Maryland: I only wish to say that if these resolutions were offered with the belief that the Executive Committee would report adversely, then they were offered for the purpose of indorsing the National Board of Health.

THE SECRETARY: The gentleman will allow me to speak to that point. How could Dr. Gihon know what action the Committee would take? He is not a member of it, and he had no knowledge that the committee would report now, to-morrow morning, or any other time.

DR. CHANCELLOR, of Maryland: I am only speaking of what the Secretary stated when he said it was possible Dr. Gihon did not know the scope of the resolutions offered.

THE SECRETARY: The gentleman is mistaken. There is a widespread idea — Dr. Cabell stated to the Committee to-day that he had become aware of a general idea existing, — that the term for which the National Board of Health was created would soon expire. This is not the fact. Only a portion of the provisions of the quarantine act expire, not the organization of the Board, which can only be changed by act of Congress. This idea may have occasioned a movement towards a new organization which otherwise might not have been made.

DR. CHANCELLOR, of Maryland: I have not the slightest objection that these resolutions should lie over, as the author is not here. But, sir, I had a conversation with Dr. Gihon this morning before he presented these resolutions, and they were, after conference with several persons, modified, and I must think Dr. Gihon understood their full scope or he would not have offered them. However, as the author of the resolutions is not present, and as it is proper he should be here to sustain his resolutions if he feels so disposed, I can see no objection to having them lie over and discussing them when he is present. Therefore I move this be made the special order for to-morrow, to be called up first, when general business is in order.

DR. DEVRON, of Louisiana: I move we adjourn.

DR. CHANCELLOR, of Maryland: I hope the gentleman will have the courtesy to allow my motion to be put before we adjourn.

DR. DEVRON: Certainly.

The question was taken on Dr. Chancellor's motion, and it was agreed to.

The Association then adjourned to Friday morning, December 2, 1881, at ten o'clock.

FRIDAY, DECEMBER 2, 1881.

## MORNING SESSION.

The Association reassembled at ten o'clock, the President, DR. WHITE, in the chair.

Prayer was offered by the REV. R. P. KERR, of Savannah.

The Secretary, for the Executive Committee, presented the list of names proposed for membership by the committee, and those named were elected.

The President submitted the following nominations for the Advisory Council :—

## ADVISORY COUNCIL.

- DR. R. D. WEBB, Livingston, Ala.
- DR. D. H. DUNGAN, Little Rock, Ark.
- DR. HENRY GIBBONS, San Francisco, Cal.
- DR. CHARLES AMBROOK, Boulder, Col.
- DR. C. W. CHAMBERLAIN, Hartford, Ct.
- DR. L. P. BUSH, Wilmington, Del.
- DR. W. F. FORDHAM, Pensacola, Fla.
- DR. WILLIAM H. ELLIOTT, Savannah, Ga.
- J. M. GREGORY, Champaign, Ill.
- DR. J. D. GATCH, Lawrenceburg, Ind.
- DR. W. S. ROBERTSON, Muscatine, Iowa.
- DR. J. J. SPEED, Louisville, Ky.
- DR. S. S. HERRICK, New Orleans, La.
- DR. HENRY P. WALCOTT, Cambridge, Mass.
- DR. JAMES A. STEUART, Baltimore, Md.
- DR. JOHN T. GILMAN, Portland, Me.
- DR. HENRY B. BAKER, Lansing, Mich.
- DR. D. W. HAND, St. Paul, Minn.
- DR. WIRT JOHNSTON, Jackson, Miss.
- DR. GEORGE HOMAN, St. Louis, Miss.
- DR. IRVING A. WATSON, Concord, N. H.
- DR. D. C. ENGLISH, New Brunswick, N. J.
- DR. C. R. AGNEW, New York City, N. Y.
- DR. THOMAS F. WOOD, Wilmington, N. C.
- DR. G. C. ASHMUN, Cleveland, O.
- DR. WILLIAM H. FORD, Philadelphia, Penn.
- DR. E. M. SNOW, Providence, R. I.
- DR. H. D. FRASER, Charleston, S. C.
- DR. A. B. TADLOCK, Knoxville, Tenn.
- DR. J. H. POPE, Marshall, Texas.
- MAJOR GREEN PEYTON, C. E., University of Virginia, Va.
- DR. J. T. REEVE, Appleton, Wis.
- DR. C. T. RICHARDSON, Charlestown, W. Va.
- DR. H. D. HOLTON, Brattleborough, Vt.
- DR. J. M. TONER, District of Columbia.



DR. GEORGE M. STERNBERG, United States Army.

DR. ALBERT C. GORGAS, United States Navy.

DR. HOSMER A. JOHNSON, National Board of Health.

DR. H. W. AUSTIN, United States Marine Hospital Service.

HON. JOHN EATON, Commissioner of Education.

DR. PLUNKETT, of Tennessee: I move that the committee suggested wait confirmation until the resolution which contemplates a change in this self-perpetuating power is disposed of. I therefore move they lie on the table for the present.

The question being taken, the motion was agreed to.

THE SECRETARY: I am directed by the President to state that he reappoints the same gentlemen who now compose the Committee on Diseases of Cattle and Swine, namely: Mr. Edward Fenner, of Louisiana; Dr. E. M. Hunt, of New Jersey; Dr. J. H. Rauch, of Illinois; Dr. H. P. Walcott, of Massachusetts; and Dr. J. M. Partridge, of Indiana.

The special assignment for the hour, namely, the resolutions of Dr. Gihon, United States Navy, in regard to the reorganization of the National Board of Health, was taken up.

DR. GIHON, United States Navy:—

MR. PRESIDENT,—I owe the Association an apology for my absence last evening. I had no idea that the resolutions would be reported from the Executive Committee until this morning, and I therefore entered into a social engagement which I might otherwise have set aside. I recognize the necessity of subordinating pleasure to duty, and I should have been here.

Before saying anything about the resolutions, I wish to disclaim the personal feeling that has been suggested as at the bottom of these resolutions.

I assure you all that I look upon each member of the National Board of Health as a warm personal friend. I cannot conceive why the suggestion of an alteration in the composition of that Board should be construed into an expression of dissatisfaction with its present members. I have the warmest personal regard for the President of the National Board of Health, and I had the honor of putting that in shape in a resolution which I offered at Nashville, and which the Association adopted, expressing not only high respect but warm, affectionate regard for him. What I said then I still mean. There is no man in the Association for whom I have a warmer, kinder, tenderer feeling than for President James L. Cabell, and I hope he will remain President of the National Board of Health as long as there is such an institution. With regard to the Secretary, Dr. T. J. Turner, he is my old schoolmate and personal friend. I have known him forty years. Dr. Bailhache is a member of a committee of which I am chairman. Dr. Smith is one whom none can know but to respect. There is a majority of the National Board of Health. Consequently I cannot be charged with having any malevolent feeling towards them.

There is another matter I wish to explain. It was suggested that I offered these resolutions believing that the National Board of Health would soon expire; that its life would cease in a short time. That is a fact.

When we met here Monday, a number of us were discussing this matter, and some of the older members had an idea that the present National Board of Health would terminate with the fiscal year. I thought so. It therefore seemed to me to be an opportune time to discuss this matter. It is a fact that the National Board of Health is permanent so long as Congress appropriates for its necessities — its existence depends on the solicitations of its members and friends for an appropriation.

The question is whether it is desirable for us to make a change in the composition of the National Board of Health. As one of the original members of this Association, who has worked ardently and earnestly for the establishment of a National Board of Health, I believe I have a right to express an opinion on the subject.

When the idea of a National Board first started, many of us believed that it should be a representative body. Many of us still believe so; and now that the matter has come before the Association, I think it is proper that we should give expression to that opinion. Let us ascertain whether we all think so, or whether a majority think so. What are the advantages or benefits of a representative body? The advantages are these: it will be coöperative and coördinate with the different State Boards of Health. There is no doubt that there are certain antagonisms, certain local prejudices existing. If the National Board of Health is composed of representatives from all the State Boards then local views will be merged — lost in the will of the majority. For instance, the National Board of Health wanted to establish a quarantine station at the mouth of the Chesapeake to prevent infected vessels getting up the Potomac and James rivers to Norfolk and Baltimore. We all know that one of the States interested objected to it. Now in a Board composed of representatives from all the State Boards, if the question had been considered and agreed to by a majority, the objection of the one State would have gone for nothing — it would have been lost in the will of the majority. Hence I feel sure such a Board would be more powerful than the present one.

Secondly, it will cause States which have no State Board of Health to organize them in order to have a representative on the National Board. Again, it is urged it will make an unwieldy Board. This is not so. It will have the character of a sanitary congress, assembling once a year, or as much oftener as necessary, at Washington, to determine on its plan of action. During the intervals between its sessions its management may be intrusted to an executive committee, which can perhaps properly consist of the representatives of the National Board of Health, who are resident at Washington. That would involve no expense, and the Board could be managed much more economically than now.

I think I have shown that, in order to make it coördinate and coöperative with State Boards, the National Board should be a representative body.

It has also been urged that a Board constituted in this way might interfere with the internal health regulations of the several States. That is an idle objection, because the powers of the government are limited in all its

departments simply to those things which concern the general good, and a Board organized in this way could do no more than that.

THE SECRETARY :—

MR. PRESIDENT, — I want to say a word, because I believe “in calling a spade a spade.” The whole story is plain, no matter what arguments, or sophistry may be used, or what real reasons may exist for a change, and I am not prepared to say there are not some, perhaps, that are good. I was on that side of the question myself at Nashville, but I have seen reasons to change since, and I will state them.

We have had a National Board for three years. Is there a gentleman present who is ready to say that it has not been a success, measurably a success? We do not expect perfection, especially in a new thing. Is it not also true that it has done better than any of us expected? This is one reason for changing my opinion. There is another. Whatever may be the reasons for reorganizing this Board, no matter how many more of them there may be than the gentleman has already set forth, this state of facts remains: you have to do three things before you can effect a change. You will have to get a bill through the House of Representatives. You will have to get a bill through the Senate. You will then have to get the signature of the President. Three just as impossible things for us to get during the next Congress, under the present condition of affairs, as it would be for us to fly. I do not mean to say it may not be done in time. But to do it in one, two, three, or four years, especially during the operation of the Quarantine Act, I believe, from my knowledge of Congress, would be utterly futile. It is comparatively an easy thing to get one house or the other to do something, but to unite all three powers in the face of what, I think, would be the laudable opposition of the present National Board, would, it seems to me, be almost hopeless. Not that it is a reason for not trying it, if it were the thing to do, but it is a reason for considering whether you will undertake to do it at a time which is inopportune. I am not prepared to say there should not be better coördination between the central authority and State Boards. I am inclined to think there should be. I believe, however, it would be a pretty noisy body you would get together from the different States, every man having his own ideas; and I should expect the sessions of the Board to be wasted in discussing individual opinions, and the progress made to be comparatively small. I submit these remarks for what they are worth. It is the way the question addresses itself to my mind. I know something of the difficulties to be met with in getting bills passed, having been for a time a clerk of congressional committees, and I understand how almost impossible it would be to get such a measure as this through both houses, especially as a good institution is already in existence.

DR. CAMPBELL, of Georgia :—

MR. PRESIDENT, — Having watched very closely, and with extreme interest, for years the slow progress of sanitation in this country, I cannot give my vote to anything which would disturb what has been the culminating result of all efforts at sanitary legislation.

As early as 1847, when the convention to form the American Medical



Association met in Baltimore, one of the first committees appointed was one on registration of vital statistics. At that time only Massachusetts, ever honorably in advance in sanitary matters, then New York, I do not know the exact date, had boards of registration.

At that time two States were in advance of all others in taking measures to follow Massachusetts and New York. One was New Jersey, and the other, it may surprise many here to learn, was Georgia. It is true New Jersey went on and succeeded in her Board of Health. But how has it been with Georgia? The early effort fell dead, and it was not until 1875 that, through a distinguished physician of Savannah, Dr. J. G. Thomas, we succeeded in securing an act of registration and a Board of Health. It was not, perhaps, a perfect act; an attempt was made to improve it. It was tampered with, and the result was that our little pittance of \$1,500 was taken from us by our legislature, and our Board has been inoperative.

This grand attainment of a National Board of Health is endangered by being tampered with. It may not be perfect, but it is a most valuable addition to the sanitary organization of the country. It was only gained by persistent and noble efforts. Let us not endanger its existence by bringing it again before Congress. It will set political machinations to work, and we will find ourselves without this valuable and important element in American sanitation.

I claim no priority in this matter but I desire to record what is due to my colleague and friend, Dr. C. B. Nottingham, of Macon, in the suggestion of a National Board of Health. It was a prominent and earnestly advocated object of his life. He presented reports, made suggestions, and clearly formulated his plan. All he could do in behalf of its origination was faithfully done by this earnest man. He has passed from among us; his voice is no more heard in our councils, or in moving the affairs of men. Though "he rests from his labors his works do follow him." We have a National Board of Health. It is acting in full concert with the State Boards. Suggest, if you please, that they appoint their agents to confer with State Boards, but I implore the Association not to attempt to disturb the original act before Congress. Its life would be imperiled. It is too dangerous to begin to tinker with a matter of so much delicacy, and yet of so much value.

DR. JAMES E. REEVES, of West Virginia:—

MR. PRESIDENT,—As one of the first members of this Association, I beg it to make haste slowly on this question. Do we not mistake our position? Is not this Association wholly voluntary? Does it bear any relation to the State or Federal Government? Now would it not be ample time to take this action when the State Boards of Health send their representatives here instructed to ask for a reorganization of the National Board?

There are now twenty-eight States with Boards of Health, aggregating a membership of active working sanitarians of not less than one hundred and sixty, a body capable of advising on this subject. As a member of the State Board of Health of West Virginia, I am not prepared to speak for

that body and say that we want the National Board of Health reorganized. What representative of a State Board is capable of speaking for his State, or authorized to speak for his State? We should touch this subject very carefully. Who can lay his hand on any act of the National Board and charge improper motives to that Board? Is not the National Board a direct outgrowth of this voluntary Association, and does this Association want to run the National Board? As a member of this Association, I am very frank to say I do not propose to be run by the National Board, and I do not want to run the National Board.

It is time for this Association, when the representatives from State Boards come here with instructions, to act in this matter. I hope, therefore, this matter will lie over; any such action now on our part would, I think, be premature.

DR. BAKER, of Michigan:—

MR. PRESIDENT,—Although it might not be desirable to secure the legislation which Dr. Gihon's resolutions ask for, it seems to me if we have a sanitary congress composed of men after the manner he has mentioned, one from each State Board, army, navy, etc., it would greatly sustain the National Board under some circumstances. It seems to me perfectly feasible to get to work and accomplish it this year, without asking Congress, President of the United States, or any one else. I think the way to do this is to do it and not ask somebody else to do it. I would like to have the resolution of Dr. Gihon amended so as to read something like this: *Resolved*, That this Association deems it desirable that there shall be a National Sanitary Congress, composed very much as Dr. Gihon suggests. You could stop there, if you wish, or go on further. When this National Board of Health was organized, the opinion of the Advisory Council of this Association was asked, if I remember rightly, relative to certain questions, and our advice was followed. If that has been done once it can be done again. I think it would be well to make provision so that in case of necessity the National Board can appeal to the States. But when you have an executive officer or officers, trammelled as they would be by such an organization as Dr. Gihon suggests, the result is doubtful. I think the National Government should be left free to act as seems best, but with this Advisory Council to fall back on for support or approval, as is the case with executive officers of State Boards.

DR. COCHRAN, of Alabama:—

MR. PRESIDENT,—I would like to submit that the gentleman's proposition is not matured enough to be voted on. I think he ought to be required to put it in proper shape, so that we can vote on it. It is now in a very crude and imperfect form.

DR. BAKER, of Michigan: I intended to say that there are not enough of us here to represent the State Boards of the whole country, and not every State has a Board of Health, and the language of my resolution would be such as to have the whole country represented.

THE PRESIDENT: You must write out your proposition carefully, so that the Association may know what it is voting on.

DR. HUNT, of New Jersey :—

MR. PRESIDENT,— I offer the following as a substitute for the original motion :—

*Resolved*, That it is the opinion of this Association that the usefulness, power, and influence of the National Board of Health will be materially advanced by no action on our part at present, and that the question of direct representation of State Boards of Health in it may safely be left to emanate from the State Boards themselves, instead of from a voluntary association.

Now, sir, I take it that when we propose to memorialize Congress eighteen months before the expiration of the Quarantine Act, we are not only doing an injury to this Association, but we are also doing an injury to the National Board of Health and to the interests of public health in this country. I think, sir, that has been so plainly presented that we should make haste very slowly in a case of this kind. I will not continue to spend time on that point, because I think it has been presented fairly. The second point is that presented by Dr. Baker, we are not the representatives of the whole country. If we believe in this general principle of representation, why should we as an Association assume authority to represent the whole country? I go farther. Why should this Association assume to represent the State Boards of Health? We are not the representatives of the State Boards, we are a voluntary Association, and it does not behoove us to advise what the State Boards should do under these circumstances. The State Boards are competent to advise the General Government for themselves, and they do not ask us, a voluntary association, to step in and give this advice. I am not willing, on certain points, to be advised by the National Board of Health, and I should say to it, under certain circumstances, that we are competent to act for ourselves in matters coming under our jurisdiction; and I should say the same thing to this Association, which is a voluntary one, without even the pretense of being a representative body, in the technical and proper sense of the word. Therefore, we are stepping out of our line when an attempt is made to represent State Boards of Health, when some of them are not represented here at all, and those which are have not been consulted as to whether they wish to have this matter acted on in this Association. I take it, when this Association comes to act on this matter without having first consulted every Board of Health, it is volunteering in a way that it does not behoove us to do. When this matter of a National Board was first brought up, I was one of those who met in Washington, in regard to it, and I insisted on some form of representation, and probably did more than any other one in securing a greater number on the Board than was first intended; and I even yet believe there should be some advisory relation to the National Board of Health; but I do not think we should declare to the country that we desire this Board of Health should be constituted on this kind of basis. Then the Commissioner of Agriculture ought to be superseded, and in his place thirty-eight persons should be put, selected from different parts of the country, to represent the country. So with the Superintendent of Census; so in the other departments. The result would be, a body that could not



do the business it was created to do. If any change is desirable I think it should tend towards placing the matter in the hands of a minister of health, who shall stand in relation to the Government as the heads of other departments. If you will look over the history of the Government Board of Great Britain, you will find that starting out with these great committees and corporations of men, it passed from one stage to another, until finally they got to the local Government Board, and one man was placed at the head of it. The same thing has taken place in other European countries. I have no plea for the National Board, it can speak for itself; but I have a plea to make for the sanitation of this country; I have a plea to make for the interests of this Association, — that we may keep clear of all such alliances.

I do not propose, for one, as a member of this Association, or secretary of the State Board of Health of New Jersey, to be run by the National Board, nor do I think the American Public Health Association should attempt to run the National Board. Whenever the States get ready to move in this direction, New Jersey is ready to move with them; but do not let us put such a burden on this Association.

DR. BAKER, of Michigan, offered the following as an amendment to Dr. Hunt's substitute: —

*Resolved*, That this Association deems it desirable that there should be a National Sanitary Congress, composed of one member from each State in the Union, members to be appointed\*as follows: In the States which have State Boards of Health by those Boards, and in other States by Governors of States.

DR. DEVRON, of Louisiana: —

MR. PRESIDENT, — I invite my friends to vote against this measure, and I shall vote against it, on this ground: that it does not reach the point. Leaving it to the various State Boards of Health will be doing nothing. They have done nothing in a number of years, and they will do nothing. If we appear before Congress it will at once awaken the interest of every State, and its Senators and representatives will be instructed as to how it desires the future National Board of Health to be formed, and give those States who do not wish any National Board of Health a chance to express their views in opposition.

DR. C. R. AGNEW, of New York: —

MR. PRESIDENT, — The resolution which the gentleman has just offered, which provides for the creation of a sanitary congress, seems to be aimed at the existence of the Public Health Association. This body is already a sanitary congress. We have not reached that stage of our development when we are composed of regularly appointed delegates. Perhaps it would be well we never should reach such a stage of development; but if the gentleman provides for the creation of a sanitary congress, it seems to me he provides for the creation of a body which will absorb the functions of the Public Health Association, and terminate the existence of this body.

The previous question was called, and the main question ordered.

The question first occurred on Dr. Baker's amendment. A vote was taken, and the question decided in the negative.

The question next recurred on Dr. Hunt's substitute. On a division there were ayes 41, nays 18.

So Dr. Hunt's resolution was substituted for the original.

The question next recurred on adoption of the substitute, and on a division there were ayes 41, nays 18. So Dr. Hunt's substitute for Dr. Gihon's resolutions was adopted.

The Secretary reported the following proposed amendments to the Constitution, which, having laid over, as required, for one year, demanded action: —

In Article III. At the beginning introduce the words: "The members of this Association shall be known as Active and Associate. The Executive Committee shall determine for which class a candidate shall be proposed. The Active members shall constitute the permanent body of the Association, subject to the provisions of the Constitution as to continuance in membership. The Associate members shall be elected only for the year for which they are proposed, and shall have all the privileges and publications of the Association, but shall not be entitled to vote. They may be reelected."

In Article III., in the first line, after the word "the," and before the word "members," insert the word Active, so that the line shall read, "the Active members shall be selected with reference," etc.

In Article III., last line, insert the words, "in either class," after the word "membership," so that the sentence shall read: "The annual fee of membership, in either class, shall be five dollars."

In Article VIII., second line, after the words, "First Vice-president," insert the words "Second Vice-president," so that the sentence shall read: "There shall be a standing committee, to be known as the Executive Committee, which shall consist of the president, First Vice-president, Second Vice-president, Secretary, Treasurer," etc.

In Article VIII., in the last line but one, strike out the words "six weeks," and insert the words *one week*, so as to read, "at least one week preceding the date of such meeting."

THE SECRETARY: —

MR. PRESIDENT, — I have, as the one offering the amendments, to say only this. At the time offered (they were written by Dr. Billings, then President, and myself) it was thought the Association was getting so large and unwieldy, and the laity element so numerous, there was danger that at a future time the professional character of the Association might be lost, and it was deemed best to adopt some provision for securing to it that force which pertains to a scientific body engaged in the discussion of scientific questions. I am in grave doubt as to the wisdom of enacting the original proposition. I am not sure whether it is best or not, or what the result will be, therefore I will move that all amendments, excepting the one making the Second Vice-president a member of the Executive Committee, be laid on the table for another year.

DR. BELL, of New York: I move the adoption of the first part of the motion of the Secretary.

The question was taken, and the motion agreed to.

DR. BELL, of New York: I made the motion I did, because I think the Executive Committee is already large enough, and has power enough. Lest

the motion I made a short time ago be misunderstood, instructing the Secretary to cast the vote of the Association, I wish to say I did so simply to facilitate business, and not because I approve of that kind of work.

DR. COCHRAN, of Alabama: Is there not another amendment pending changing the organization of the Executive Committee?

THE SECRETARY: That is in relation to the Advisory Committee. It is not created by constitutional provision. It was created by vote of the Association at the Nashville meeting two years ago. Dr. Plunkett's resolution contemplates a change in the construction of the Advisory Council, but not of the Executive Committee. The amendment now before the Association is the one making the Second Vice-president a member of the Executive Committee.

DR. COCHRAN, of Alabama: I desire to say I am entirely opposed to that resolution, because I am opposed to the present Executive Committee and the present policy of the Association in regard to it. I understood there was a resolution pending to so amend the Constitution as to create an Executive Committee on a different basis. Having been misinformed on that, I want to do all I can to keep the present Executive Committee as offensive and objectionable as it can be kept, and I think it would be difficult to make it more offensive to the proper sense of the Association than it is now. I say that without intending in the slightest degree to reflect on the gentlemen who compose the present Committee. We have an Executive Committee consisting of nine persons. They are very rarely, if ever, all of them at our meetings at any one time, so that the bare majority present must act as such committee, and of the five or six persons present at a meeting not more than three or four are usually present at the meetings of the Executive Committee.

Now it is the function of this Executive Committee to control all the business of the Association, to state what papers shall come before the Association and at what time, to decide who shall be allowed to read essays and who not. It is also the business of the Executive Committee to determine virtually who shall become members of this Association. The constitutional provision is that all applications for membership shall be submitted to the Executive Committee, and that the Executive Committee shall report back to the Association to be voted on such names as a majority of the Executive Committee approve. The names not approved of are not reported back with a statement of the reasons why they rejected those gentlemen; and their friends are left to find out by accident, if they can, on what grounds they were rejected. The whole effect of it is that three or four members of the Executive Committee control the membership of this Association; in fact, they say who shall be members and who not of the Association, the Association at most having only the poor privilege of rejecting some name which has received the endorsement of the Executive Committee, but no power to go behind its action and elect a member they have not chosen to approve of. All the power of this Association cannot elect a member who is objectionable to three or four gentlemen, or a majority of them who constitute the number who do actually the work of



the Committee. I submit this is an intolerable condition of affairs, and it is not to be endured any longer than we can help it. I have objected always to the oligarchical Constitution of this Association placing the authority in the hands of the Executive Committee. I have never taken part in a movement for the amendment of the Constitution, because I have not felt sufficient interest in the matter, but events occurring this session have convinced me that it is very necessary something shall be done in this direction, and I oppose any effort to strengthen the Executive Committee, because I think we should get rid of it as at present organized as speedily as possible.

DR. AGNEW, of New York :—

MR. PRESIDENT, — I would remark that if the gentleman should introduce a resolution carrying out his ideas, practically abolishing the Executive Committee by robbing it of its functions, that after having done so we would be called on to constitute a similar body and clothe it with functions identical with those which this body now performs.

Is there a body in existence of this kind in which the character of the candidates for admission is discussed in open session? I do not know of any such body. I should be sorry to nominate a gentleman to such a body, and have his name run the gauntlet of the promiscuous discussion which would ensue. I think these functions are always delegated to a smaller number. You cannot discuss the qualifications of members to such bodies as these in a town meeting. Therefore, I am quite sure that this Public Health Association will not adopt the views which my amiable colleague has now propounded.

The question is whether the Association has met the expectation of its founders or not; whether it has or has not had a career which entitles it to public respect. I think it has. If it has, Mr. President, is it not obvious that a large portion of that credit is not only due to the character of the papers which have been presented at its meetings, and the influence which it has through these papers exercised on the public mind, but also to the fidelity of those men who, having been elected by us to office, performed the functions of the office to which we have called them? Are we prepared at this meeting to array ourselves against our officers, and call the attention of the public to the fact that these men whom we have elected and whom we have by our Constitution clothed with certain functions, have been unfaithful to the trusts we have reposed in them? I for one am not prepared to take such action.

THE SECRETARY :—

MR. PRESIDENT, — I do not think it worth while to reply to any strictures, because not sensible of having done any wrong, but I would suggest to the member from Alabama that if the present constitution of the Executive Committee and the orders under which it acts are objectionable to him, there is a straight and easy way to change them, namely, by amending the constitution. I do not think that it is necessary to inveigh against men who are endeavoring to carry out the orders as they stand, when, by changing those orders, he can accomplish his purpose.

DR. COCHRAN, of Alabama: I commenced by saying I did not intend any reflection on the present members of the Committee, but its organization is vicious and it ought to be changed. All the work falls on three or four men, who cannot possibly represent the general interests all over the country. They do not know the candidates presented to be acted on, therefore they are not prepared to do that responsible work, and it ought not to be done in that way.

The question recurred on the amendment of the Secretary, to make the Second Vice-president a member of the Executive Committee.

The vote was taken, and it was decided in the affirmative.

THE SECRETARY:—

MR. PRESIDENT, — I am directed by the Executive Committee to report the resolution of Dr. Plunket (see p. 387), with the recommendation that it do not pass.

DR. PLUNKET, of Tennessee: I move the adoption of the original resolution for the report of the Committee.

DR. SAPP, of Tennessee: I cordially approve of the resolution that has been offered by Dr. Plunket, and I state authoritatively that in that I represent the unanimous wish of every member from Tennessee who is present in this Association or has been. This purports to some extent to be a representative body, and, if a representative body, then those who are members of it ought to have some voice in the selection of its officers. I was of the impression that Dr. Plunket's resolution went further, and covered the Executive Committee as well as the Advisory Committee.

THE PRESIDENT: It is a constitutional committee, and can only be changed by amendments to be brought up next year.

DR. SAPP. Then it cannot be touched now, and the only question is on the adoption of Dr. Plunket's resolution. I can only say that I hope there will be no opposition to a proposition of that sort, which commends itself to us all as being just and fair.

DR. GIHON, United States Navy: I move Dr. Plunket's resolution be made an amendment to the Constitution. That will obviate any objection, and meet, I think, general approval. We will not then go behind the action of the President. It will fix the thing for the future, and will give us a representative body.

DR. COCHRAN, of Alabama: Let it pass now in its present form, and then move it as an amendment to the Constitution.

DR. GIHON, United States Navy: I do not wish to show discourtesy to our President.

DR. COCHRAN, of Alabama: It is not intended as a discourtesy.

DR. GIHON: Nevertheless it would be.

DR. PLUNKET, of Alabama: The President had notification that this resolution had been presented, and it would have been courtesy on his part to await the action of the Association on it.

DR. AGNEW, of New York: Whether the motion is intended to be one of discourtesy or not, is not the question, but whether practically it is not a vote of want of confidence.

The question then is, whether you propose to pass that resolution and so express your want of confidence? If so, we have a right to hear from the gentleman who moved the resolution, and those who join him in the advocacy of the principles on which his resolution is based, and the reasons they have for reorganizing the advisory body.

DR. COCHRAN, of Alabama: It strikes me to be an extraordinary argument to present here, that because it is proposed to pass a resolution over the recommendation of the Executive Committee, it expresses a want of confidence or courtesy. Are we to be placed still more under the power of the Executive Committee than we already are?

THE SECRETARY: The gentleman is in error. The Executive Committee does not make these nominations.

DR. GIHON, United States Navy: The President has made these nominations. It is the President's act in offering the names, and I hope the Association will indorse those names. I am entirely in favor of Dr. Plunket's resolution, but I think the most courteous and satisfactory way of doing this thing is to move this resolution as an amendment to the Constitution, and to confirm these nominations made by the President.

The question was taken on Dr. Gihon's amendment to Dr. Plunket's resolution, and on a division there were ayes 32, noes 24, and Dr. Gihon's amendment was adopted.

The question then recurred on Dr. Plunket's resolution as amended by Dr. Gihon, and on a division there were ayes 45, noes not counted.

So Dr. Plunket's resolution as amended was agreed to.

DR. GIHON: I move the nominations of the President for Advisory Committee be taken from the table and confirmed.

The motion was agreed to, and the nominations confirmed.

The Secretary laid before the Association a partial report from MAJOR W. T. WALTHAL, of Mississippi, chairman of the Committee on Management of Epidemics, asking for further time.

On motion, the request was granted.

DR. JOHN MORRIS, of Maryland, presented the Report of the Committee on Prevention of Venereal Disease. (See page 423.)

He also presented an individual (minority) report of his own. (See page 424.)

DR. GIHON, United States Navy: —

MR. PRESIDENT, — As chairman of the committee, it is my duty to call the attention of the Association to the fact, that the act which Dr. Morris has read is his own individual act. It is entirely disapproved of by the committee. The first act reported has received the signatures of all the members. We felt ourselves pledged to the Association in no way to touch the question of prostitution. Our object was simply to draft a law which would enable us to put that disease in the category of other diseases. I am going to ask the Association to continue the committee another year, and to add to the committee a lawyer, that he may assist us to put the act in legal terms. I suggest the name of Hon. Erastus Brooks. I am assured by the Medico-Legal Society of New York that it proposes to draft a similar law to



be presented to the New York Legislature. There is one to be submitted to the Pennsylvania Legislature.

Perhaps it would be well to submit Dr. Morris's report to the committee. I feel personally that any public reference to matters on which he reports, some of which I wholly approve of, by this Association, will only retard our work.

DR. BELL, of New York: I would suggest to the gentleman that the Hon. Erastus Brooks is not a lawyer.

The question was taken on continuing the committee for another year, and it was decided in the affirmative.

Dr. HUNT, of New Jersey: —

MR. PRESIDENT, — I think it is time the other side of the question should be heard, and be heard directly through members of the committee. We want to get at the truth. Therefore I move that the Chair appoint two additional members, and the committee have authority to appoint its own lawyer.

DR. GIBON, United States Navy: I am perfectly willing the other side should be heard, and I ask that the most persistent opponent of our cause be added, Mr. Wines, of Illinois.

The Secretary asked leave to read by title a paper by Rev. F. H. WINES, of Illinois, entitled "Sexual Quarantine," which he wished to have stand as his expression on the subject matter of these Reports. Permission was granted, and the paper is printed herewith as part of the discussion: —

MR. PRESIDENT, — Quarantine is an institution which depends for its existence upon legislation. Its purpose is to prevent the spread of contagious diseases, by preventing contact between the infected and the non-infected. This it accomplishes by seizing and detaining persons suspected of being in condition to communicate the dreaded virus, until the proper officer is satisfied that the peril or contagion is past, if it ever existed. To justify the interference with personal liberty involved in its establishment, the liability to infection must be shown to be great, and the consequences serious. But where the necessity for quarantine is admitted, there can be no dispute as to the propriety of making it thorough and effective.

I employ the term "sexual quarantine," to designate similar measures of protection against forms of contagion not ordinarily communicated except through contact of persons of opposite sex. Like all other quarantine, this necessarily implies official inspection, the isolation of infected cases, and treatment in government hospitals. We might as well quarantine against yellow fever without these appliances, as against the venereal poison. The analogy seems to me to be perfect.

And yet, at the suggestion of the Committee upon the Prevention of Venereal Diseases, this Association adopted, at New Orleans, last year, a resolution calling on all Boards of Health in this country to — do what? To attempt to secure the establishment of sexual quarantine? Not at all. What then? To urge the passage of laws and ordinances constituting it a criminal offense knowingly to communicate, directly or indirectly, any contagious disease. The Committee on the Prevention of Venereal Disease

recommended not prevention, but punishment. Instead of advising us what the medical profession should do, it told us in effect that the medical profession is powerless, and that the remedy for the evils flowing from this scourge is to be found in the amendment of the criminal law. And this Association adopted the committee's conclusions. Some of us protested against the action taken, but in vain. We believed that our Association would do well to confine itself to its legitimate sphere of action ; that it is the province of the student of criminal jurisprudence, rather than of the sanitarian, to say what acts shall be regarded as crimes, and how they shall be punished. We had no faith in the efficacy of the alleged remedy, because no criminal action can be begun otherwise than by complaint ; but in case of the communication of a venereal disease, who will enter the complaint ? The question answers itself. The Association seems to have overlooked the distinction between diseases which may be contracted without discredit and those which are, in their origin, disreputable. It is not surprising, therefore, that the resolution adopted last year has borne absolutely no fruit. Not a single Board of Health anywhere has paid it the slightest attention. Why is this ? I venture the opinion that it is in part because every one who reflects at all upon this question must see that we want sexual quarantine or nothing ; that no half-way measures are of any value. It is useless to lock the stable-door after the horse is stolen. Indeed, the Association indicated its dissatisfaction with its own position, by directing the committee to submit, at the present session, a project of a law, adapted to secure the desired end.

What ground must such a law cover ?

First. Quarantine, as has been said, implies inspection. Inspection implies inspectors, persons to be inspected, a time and place for inspection, fees to inspectors, and lock hospitals. These are all points which require decision, at our hands, before we present ourselves and our projects to the State legislatures. We must be ready to meet the inquiries and the arguments of the lawyers, in particular, whose voice is so influential in legislation.

Whom shall we ask to have inspected ? Men, or women ? We are probably all agreed, that of the two, the inspection of men is the more effective, if indeed it is not the only effectual mode. Venereal infection may elude detection in women, even where it exists. We are probably further agreed, that the inspection of men is much more difficult than that of women. The women whom it is desired to reach belong to a class ; they adopt a licentious life as a means of gaining a livelihood. But in order to the inspection of men, it would be necessary to close the doors of all houses of prostitution at all hours of the day and night except those named in the law ; and to provide that a physician in waiting should be in attendance, every evening, at every such house, whether his services are or are not required. This is so obviously impracticable, that I will not take up your time in discussing it.

Let us next consider the inspection of women. The essential prerequisite of inspection is registration. Without a carefully devised and well ad-

ministered system of registration you can accomplish nothing. A list of the women liable to inspection is necessary, in order that they may be notified of the obligation to present themselves for examination, and that the inspectors may know when they have completed their task.

Registered women must be under police surveillance, and liable to specified penalties in case of failure to appear for inspection at the appointed time and place ; and to the police must be confided the enforcement of the rules laid down for their government.

Finally, the inspectors' fees must be paid ; and it is only reasonable to suppose that they will be paid, not out of the general revenue fund, which is collected from the public at large, but from the pockets of those more immediately interested in the business which it is proposed to regulate and protect.

Out of this special fund, too, will come the cost of maintaining the necessary lock hospitals. Power must of course be vested in the police to compel women who do not successfully pass the official inspection to resort to these hospitals to be cured ; and they must be detained there or in prison until they are cured. They are called lock hospitals because the doors are locked on all who enter. Without this compulsory isolation, how is an efficient quarantine to be maintained ?

The project of a law submitted by the committee should cover all these details of administration, and should clearly indicate the regulations which are to be established for the government of prostitutes, and the penalties by which they are to be enforced. It is especially important that we should understand what women are liable to registration, and on what evidence. If the conditions of registration are too loose, great injustice may be done, and the rules themselves may be used to accomplish infamous ends. If, on the other hand, they are too rigid, they will not secure any very great amount of security against the spread of the venereal disease.

I have sketched in the merest outline the salient features of an effectual quarantine against sexual contagion. Permit me for a moment to call your attention to the immense practical difficulties to be encountered in administering it. It is of course no conclusive objection, to say that the system will be only partially successful, because even a partial success might be a real gain. A partial quarantine may be better than no quarantine at all. But it is not to be supposed that all women liable to communicate infection will be registered, and those not registered will not be inspected, and so the virus will continue to be disseminated through the community, in spite of all effort to the contrary. It will also be understood that infected men will infect registered women after one inspection and before the next, thus sowing the seed of fresh infection of men. We have yet to learn that any country which has adopted the registration of prostitutes has succeeded in ridding itself of the venereal disease. I believe that it is usual to inform American and English travelers that the cases seen in Continental hospitals were contracted from persons not resident in the country visited, but such statements may be taken with some allowance for local pride, like statements about malaria and milk-sickness. Until the millennium arrives, it is



not to be expected that all policemen, or even all doctors, will be perfectly intelligent and upright ; and without such perfection, neither your registration nor your inspection will be faultless. The net spread may catch many, but it will never catch more than a part of the fish in the sea.

But, for argument's sake, let us admit that the system will do all that its most ardent advocates claim for it. What are the evils to be anticipated from its adoption? Every wise man has found out, from his experience and observation, that all gains imply losses. Was it Napoleon who said that nothing in this world is ever stolen? In other words, nature takes care that we pay for all that we get. When we strike the balance between the gain and the loss involved in the radical change of our system of laws and social organization of which the registration of prostitutes is the initial step, we may well pause before making the plunge.

As our laws now stand, prostitution is an offense, punishable by fine and imprisonment. It is true that the penalty is not vigorously enforced. But the theory of the law is, that illicit sexual relations, outside of marriage, are to be punished ; that the violator of the law, in this regard, assumes his own risk ; and, in fact, the penalty is often insisted upon. The laws against prostitution, against seduction, against adultery, and against other forms of licentiousness, are designed to serve as so many safeguards against the overthrow of the institution of marriage, which is generally believed to be one of the principal agencies for the development and elevation of the human race. Around this point of attack, the fiercest fight of modern times is waging. In the final outcome are involved the destinies of our children and of their children after them. Now the registration of prostitutes means, the repeal of all laws against prostitution. It is impossible to enact a law providing that all women of known loose character shall be listed, placed under police surveillance, required to observe certain regulations, especially the rule making it obligatory upon them to submit to medical inspection, charged a fee for such inspection, furnished with an official certificate of good health, or isolated in a special hospital established for their benefit, and then, after all this, arrest and punish them as prostitutes. If punished at all, it will be for violation of rules. Prostitution is legalized by such a law as this ; and it is not without reason that the system is entitled the licensing of prostitutes, for the physician's certificate is a virtual license. The prostitute's vocation is placed on the same basis as any other authorized business pursuit. The only relation to it sustained by the government is that of patronage ; the government assumes the responsibility of giving a guaranty to the customer against fraud and imposition.

I will not discuss the effect upon morals, for that lies outside of the sphere of this Association. I will not undertake to point out what a serious question of law is involved in the proposed legislation, for that would take too long. The system is not in accord with English ideas of law, however it may fit into the codes of the Latin civilizations. But I will say, in a single word, that it is the part of medical men, in my judgment, to remember that the body politic is an organism, as is the human body. You are peculiarly familiar with the laws which control organic action, and you know that,

with the best possible intentions, a physician may do infinite harm with his remedies, through confining his attention too exclusively to some one aspect of the case in hand, forgetting the other symptoms, conditions, and results in other directions, which should have commanded a share of his thought. The question of sexual quarantine is not exclusively a question of sanitary science ; it is a medico-legal question. You are called to meet it not as sanitarians only, but as husbands, fathers, and citizens. If reflection convinces us that the inevitable consequence of adopting a system of registration and compulsory examination will be to increase the amount of prostitution in the community, to break down the reverence for virtue, to make marriage more infrequent as well as less sacred, we are forced to consider whether the venereal disease, or the licentiousness of which the disease is a symptom and an effect is the greater evil. This is a proper subject for debate. We may not debate it here, but no legislature can fail to discuss it before passing any new laws respecting the relations of the sexes. Dr. Gross, of New York, in advocating registration, said publicly that prostitution is the normal condition of the human race. Others have said that every woman has the natural and inalienable right, guaranteed to her by the Constitution of the United States, to dispose of her person at her pleasure. Men who hold views like these are severely logical, when they seek to engraft them upon the statute books. I do not for one moment suppose or think that all who favor registration entertain the same opinions. But I am unable to see how, if prostitution is a right, adultery and incest are not also rights ; and I represent a very real and a very general fear of the effect of tampering with our present laws for the protection of marriage, however unintelligent or mistaken that fear may be. It seems to me advisable for an Association which has so certain a career of usefulness before it, not to destroy its influence for good by committing itself to experiments in legislation in opposition to the sentiment of nearly the entire country.

Permit me, in closing, to recapitulate, briefly, the train of thought pursued : —

Legislation for the arrest of the venereal diseases which does not go to the extent of an effective quarantine is practically worthless.

A partial quarantine against these diseases can be maintained, and has a real sanitary value, though its actual value is easily overestimated.

Quarantine, however, implies inspection. Inspection implies registration. Registration implies a virtual license of prostitution. The repeal of laws against prostitution is a direct encouragement of licentiousness, and an indirect blow at the institution of marriage.

If licentiousness is as great an evil, and marriage as great a blessing as many think, it becomes a question whether the evil results of registration to the community would not more than counterbalance its sanitary advantages ; and the further question arises, whether we can afford to fool with the structure and functional organization of the body politic, without knowing precisely what we are about? Especially in the face of the protests made by the public itself against the proposed treatment? Has either side, in this controversy, a monopoly of heart or brains? And shall we not

respect each other's sincerity and capacity, whatever the outcome of the discussion?

The question was taken on Dr. Hunt's motion, and it was decided in the affirmative.

The Secretary also laid before the Association the report of the Auditing Committee on the Treasurer's Report, with the indorsement thereon, that it had been examined and found correct. Signed by DR. REEVES, of West Virginia, in place of DR. BAKER, of Michigan.

DR. BAKER explained that he had declined to serve on the committee, and the President had appointed Dr. Reeves for reasons satisfactory to both, and that this accounted for the change in the committee.

The Secretary laid before the Association the following resolution, offered by DR. S. S. HERRICK, of Louisiana, on "Railroad Sanitation," which was referred to the Executive Committee under the rule:—

*Resolved*, By the American Public Health Association, that we regard the subject of Railroad Sanitation, which has been presented to the Association at this meeting, as one of great importance to the public and to transportation companies; to the former, as conserving the interests of public and private hygiene; to the latter, as a measure of enlightened economy and justice.

Also the following resolution, offered by DR. MARVIN, of Florida, relative to the death of President Garfield, which took the same reference:—

*Resolved*, That this Association, through its Executive Committee, cause to be prepared such resolutions as may seem best to them, expressive of the sorrow and regret at the death of James A. Garfield, late President of the United States, and that a page of the record of this Association be kept as a memorial page, and that a copy of the resolutions be sent to Mrs. Garfield.

The papers of Prof. JAS. L. CABELL, of Virginia, on "The Origin and Progress of International Hygiene" (see p. 16), of DR. A. Y. P. GARNETT, of the District of Columbia, on "Observations on the Potomac Marshes" (see p. 186), and of DR. THOS. J. TURNER, United States Navy, entitled "Some Remarks upon National and International Sanitary Jurisprudence" (see p. 32), were, by request of the authors, read by title by the Secretary.

DR. W. C. VAN BIBBER, of Maryland, read a paper on "Two Suggestions concerning Healthful Buildings." (See page 305.)

The Secretary presented a list of names proposed for membership, and passed upon favorably by the Executive Committee, all of which received the approval of the Association.

The Association then took a recess until three o'clock P. M.

#### AFTERNOON SESSION.

The Association was called to order at three o'clock by the President, DR. WHITE.

The Secretary read a list of names of persons favorably passed upon by the Executive Committee for membership, all of whom were elected.

The Secretary reported back from the Executive Committee the resolution



of DR. HERRICK, of Louisiana, on Railroad Sanitation, with the recommendation that it pass. (See page 417.)

The question was taken, and it was decided in the affirmative.

Also the resolution of DR. MARVIN, of Florida, relative to the death of President Garfield, with the recommendation that it pass.

The question was taken, and it was decided in the affirmative.

The following named gentlemen were added to the Committee on Prevention of Venereal Disease: Dr. C. R. Agnew, of New York, and Rev. F. H. Wines, of Illinois, the committee as constituted to join a legal member.

THE SECRETARY. On behalf of the Committee on Necrology, I am desired to ask leave to report in print in the next volume. The report has been prepared, but the audience is small, and the Report somewhat long, and I therefore, in their behalf, ask leave to report in type.

DR. RAUCH, of Illinois. I make the suggestion that the names of all members who are dead be included in that report.

The suggestion of Dr. Rauch was accepted.

The question was taken on the motion of the Secretary, and it was agreed to.

The paper of DR. CHAS. F. FOLSOM, of Massachusetts, "On the Prevention of Insanity," was read by title. (See page 83.)

DR. C. W. CHAMBERLAIN, of Connecticut, read a paper on "Malaria in Connecticut." (See page 174.)

DR. FALLIGANT, of Georgia:—

MR. PRESIDENT,—Whilst I confess myself admiringly as to the learning and diligence displayed by the gentleman who has just read his elaborate and carefully digested paper, I must at the same time beg leave to say that, to my mind, the *germ theory* does not satisfactorily explain certain phenomena connected with malaria, which are quite familiar to those of us whose habitations have existed in localities longer affected by malarial influences than appears to be the case with New England. In illustration of my meaning I will cite you a circumstance narrated to me by one of my most intelligent patients, General George P. Harrison, who for many years was a rice planter, and necessarily exposed to some of the worst forms of malaria. The settlement, that is, the houses where his laborers dwelt, had been located at the extremity of an open cut through the woods, perhaps a half mile from the rice field, and by this funnel way, exposed to the malaria from the rice field, as it followed the atmospheric currents which coursed their way along this opening up to the settlement. So long as the hands continued to sleep in this place, they were subject to frequent and successive attacks of malarial fever. The houses were removed a short distance into the woods away from the currents of this opening, and the occupants speedily regained an average healthy condition. Now, both of these settlements were in the same region, the same county, the same locality, indeed, the same climate, temperature, etc.; yet one, a little ways removed from the other sickly spot, proves healthy. Does it not appear to you, sir, that these *germs*, as they are called, were most considerate in their distribution? Born,

bred, and dying, along this funnel way, *they could not be persuaded to fly to the right nor the left beyond the lines of its currents.*

The report of the Auxiliary Sanitary Association of New Orleans, of which you were also an honored President, furnishes still stronger testimony for doubt about this germ theory as to malaria, since the most carefully gathered statistics of malarial fevers occurring in New Orleans show that by far the great majority of cases occur along the lines of streets running at right angles or terminally to the malarial regions outside the city, and that but a few cases, comparatively, develop in the sheltered *cross streets*. Again, sir, I must protest that if this poison be a *germ* it is a *most considerate* germ.

To my observation, when decomposition is going on it develops a *smell*; and the ratio of its offensiveness may be measured by the intensity and putridity of the decomposition. I well remember that prior to the terrible epidemic of 1876, in Savannah, the flat regions to the east and west were green with the scum of stagnant waters and vegetable decay. One felt constrained to hold his handkerchief to his nose until he had driven beyond the offensive region. But this *smell*, sickening as the odor of the ailanthus blossom, did not appear to me to arise from a thing of *life*, a *germ*, if the gentleman will so have it, *but from a condition of death, of decay from decomposition*, out of which condition it would seem to me natural that in vegetable, as in animal life, putrid, perhaps I should say *decomposited* odors, should arise.

Have you never known a person made sick by the smell of a carcass? And if the whole atmosphere be permeated with the effluvia of millions of vegetable (and perhaps minute animal) carcasses, who shall say that this condition of decay and death is not the source of disease to exposed beings susceptible to such influences?

In conclusion, permit me once more to say, sir, to the gentleman whose paper I am discussing, that whilst I am not prepared to reject the germ theory, there are so many facts in our southern experience which its present development does not fully explain, that I am not yet, like him, prepared to give it so comprehensive an indorsement.

DR. WM. BAILEY, of Kentucky:—

MR. PRESIDENT,—I desire to say a word or two in regard to this subject. I see no reason, sir, for departing from our preconceived notions in regard to the production of malaria. I will premise what I say by remarking that I lived in a malarial district for perhaps twenty years and over. I see no reason for departing from the time-honored belief that malaria is distinctly due to local influences and the concurrence of certain circumstances, namely, decomposition of vegetable matter and filth, a certain amount of moisture, and a certain range of solar temperature.

I object, sir, to the ideas advanced both in the paper of to-day and that read on Wednesday, which seem to convey the idea to my mind, at least, that it is due to the introduction of a germ, which is necessary for redevelopment. I object to such an expression as, "it crept from place to place." I object to such expressions as that it requires one, two, or three years to reach from this town to that. To my mind it is a more difficult proposition

to believe. I would rather believe according to the old theory by which we have been accustomed to believe these things: whenever we have the local conditions present we have the production. If we have vegetable matter under decomposition, with proper amount of moisture and a certain average range of local temperature, we produce the so-called poison malaria. I care not whether you call it a germ or not, this influence or cause of disease is produced whenever the conditions are favorable. It is a well-known fact in our region, if you have a marsh which is in condition to give forth this poison, by covering it with water you can drown it out, and for the time being destroy it. So we recommend, if you have a marsh liable to produce malarial fever, flood it until the time of the year is past for solar heat to produce decomposition.

I do not see anything in this whole matter to convince me that it spreads in the way suggested from place to place. For instance, we have two towns ten miles apart. This season we have it in the first town, "A," and the second season at "B." There must have been the proper conditions at "B" the second season, for its production, whether it had ever been there before or not. I am not at all convinced that it is necessary to account for the introduction of this malaria throughout the New England section by a gradual growth of this kind as supposed by the authors of the papers read to-day and Wednesday.

DR. CAMPBELL, of Georgia:—

MR. PRESIDENT,—I would only add to what Dr. Bailey has said, that it is observable in every country, whenever a mill-dam breaks the country suffers until the mill-dam is mended. It is a peculiar vegetable poison, and John K. Mitchell, father of Dr. S. Weir Mitchell, made the first great effort to prove it was vegetable poison. His work is one of the most valuable ever written, but born a little before its time.

DR. FALLIGANT, of Georgia:—

MR. PRESIDENT,—I would like to ask Dr. Campbell whether, in order to drown this poison out, two conditions are not necessary: first, that the water should be deep; second, that no impurities from adjacent land shall be allowed to drain into it, because if such a thing happens we have difficulty from this very impurity, if the depth of the water is not sufficient. I would like to have his experience.

DR. CAMPBELL, of Georgia: I refer to the ordinary refilling of a mill-dam. Of course the decomposition of wet vegetable matter would be as bad as dry, but whenever the dam is mended, and the pond is sufficiently refilled for the mill to go to work, the neighborhood is entirely relieved of the fever. They may have periodic returns, that is, every seventh year. This is a singular law of intermittency. But I think no new cases will arise from the mill-dam if it is sufficiently filled with water to reëstablish the grinding of the mill. I believe it requires a considerable depth of water to drown out this poison.

DR. JONES, of Pennsylvania:—

MR. PRESIDENT,—I would like to call attention to one more thing, and that is in relation to the soil water and the aeration of the soil which takes



place by this continual flow and reflow of the soil water itself. It is not merely the draining off of the water of the dam that always produces this poison, but sometimes the lowering of the water level will produce malaria ; at least no other cause seems assignable for it.

THE SECRETARY offered the following resolution, which was referred to the Executive Committee, and by them reported back favorably : —

*Resolved*, That this Association bespeaks the active coöperation of the President and the Congress of the United States in securing such an International Sanitary Congress, with plenary power given its delegates, as shall give the force of International Law to the conclusions upon the subjects of International Sanitary import arrived at, *ad referendum*, by the International Sanitary Conference of 1881, at Washington.

On motion of the Secretary, the following resolutions were unanimously and heartily adopted : —

*Resolved*, That the most cordial and unanimous thanks of the Association are hereby tendered His Honor, John F. Wheaton, Mayor of the city, for abounding hospitality, both official and personal.

To the Local and Transportation Committees for their most happy efforts in promoting the success of this meeting, and especially to the Chairman, George C. Freeman, Esq., who has incessantly labored for the comfort and convenience of all, and in behalf of the members and their ladies for the delightful excursion down the Savannah River.

To Captain George A. Mercer for his eloquent welcome and continued courtesies.

To the Georgia Medical Society and its President, Dr. R. J. Nunn, for their cordial greeting.

To the several distinguished gentlemen who so ably presided on the evenings of the session.

To the clergy of the city who have so acceptably officiated at the opening of each day's session.

To the Georgia Historical Society, for its invitation to enjoy its facilities, as also to the Savannah Cotton Exchange.

To Colonel J. H. Estill, the proprietor of the *Morning News* and agent of the Associated Press, whose enterprise and active assistance have greatly aided in securing the success of the meeting ; and to other papers of the city for generous mention and assistance.

To the gentlemanly and obliging City Editor of the *News*, Mr. B. H. Richardson, for his constant devotion to the interests of the Association throughout the session.

To the managers of the many lines of railroad, who have so liberally afforded favors in transportation, thereby contributing immeasurably to the success of the meeting and convenience of members.

To Mr. H. Griffith, manager of the Western Union Telegraph Company, and to the Telephone Company, for the service of their wires, affording a warmly appreciated facility.

To the members of the Association resident here and to the citizens, for their earnest endeavors in making so delightful the stay of the Association in this city.

To the ladies of the Episcopal Orphans' Home for their zealous and thoughtful care and provision for the enjoyment of all on the excursion down the river.

To the Captain and officers of the steamer St. Nicholas for their courtesy and attention.

To the hotel proprietors of Savannah, for their kind reduction in rates.

To Capt. M. T. Quinan and his obliging corps of assistants for their efficient attendance upon the meetings of the Association at Masonic Hall, and their ready anticipation of every requirement.

DR. JEROME COCHRANE of Alabama, proposed the following Amendments to the Constitution, which, under the rules, were laid upon the table for one year.

#### PROPOSED AMENDMENTS TO THE CONSTITUTION.

That Section VIII. of the Constitution shall be so amended as to read as follows:—

VIII. There shall be a Standing Committee, to be known as the Executive Committee, which shall consist of twenty-one members, of whom no two shall be from the same State. The members of the Executive Council shall be elected for three years, except that at the first election after the adoption of this amendment they shall be divided into three classes, of seven members each — one class to serve for one year, one for two years, and one for three years. They shall be nominated in the same way as other officers of the Association. A majority of the whole number of the Council shall constitute a quorum, and whenever it occurs that a quorum is not present at any session of the Association the President shall appoint a number of temporary members to make up a quorum, said temporary members to serve only for that session. . . . All committees, etc., to the end of the section as at present.

That in Section IX. the third clause, which is in these words, “to consider all applications for membership, and, at the regular meetings, and report the names of such candidates as the majority shall approve,” shall be amended by adding the following words: “and when any application for membership comes before the Executive Council, from which they may deem it advisable to withhold their approval, or which may seem to require investigation, they shall notify the member indorsing the application, with the grounds of objection, so that the applicant may have an opportunity to appear before the Council in person or by his friend to vindicate himself, and any such applicant who is dissatisfied with the final action of the Council shall have the right to appeal to the Association.

DR. JAMES T. REEVES, of West Virginia, offered the following, which was adopted unanimously and by a rising vote:—

*Resolved*, That the thanks of this Association be and they are hereby tendered to the retiring President, Dr. C. B. White, for the dignified and impartial manner in which he has discharged the arduous duties of his office during the current year, and we cordially bespeak for him long continued improved health and happiness.

*Resolved*, That the thanks of this Association be also most cordially tendered our very efficient and accommodating Secretary, Dr. Azel Ames, Jr., for the prompt, faithful and expeditious discharge of his arduous duties.

There being no further business, the Association adjourned *sine die*.

## REPORTS OF COMMITTEES.

## REPORT OF THE COMMITTEE ON THE PREVENTION OF VENEREAL DISEASES.

The report of the special committee made to the Association at New Orleans, last year, was chiefly devoted to a detail of the sufferings brought on society and the evils wrought to the State by the unchecked spread of venereal poison throughout our vast country. Some suggestions were made, in a general way, as to the proper means to arrest this great scourge ; but no definite plan was suggested looking to legislation on the subject by the different States or general government. It has been the labor of the committee since that time to devise and frame such enactments as would secure the end proposed, and at the same time meet with popular favor and acceptance. This has not been an easy task. The subject is a delicate and trying one, and great difficulties beset all efforts to bring it to the knowledge of the people, and particularly to those who are engaged in making our laws. It is proposed, however, during the coming winter to submit to a few of the Legislatures of the States bills of a proper character, which, it is hoped, will be passed by these bodies. This will be a tentative measure, and will, even if not successful, serve to bring the whole matter before the people of the country, and be a means of enlightening them in regard to the great evils with which they are surrounded.

Your committee have been greatly encouraged in the prosecution of their labors by the evidence furnished by the late select Committee of the British Parliament appointed to examine into the workings of the Contagious Diseases Act of Great Britain. This testimony shows conclusively the great advantage to society to be derived from the operations of legal enactments on this subject. From the evidence of many gentlemen, including clergymen of the highest standing, it has been shown that not only has disease been greatly lessened, but a very decided moral improvement has been brought about in the lives of those subject to the operation of the law.

Your committee have been restricted in the preparation of the law now submitted to the Association by the character of the resolution adopted at the last meeting, as well as by the spirit of the discussion, which took place on that occasion. They have, therefore, confined themselves in the preparation of a legislative act to the exact wording of that resolution :—

An Act, entitled an Act for the Prevention of Contagious Diseases in the State of . . .

ARTICLE I. — Be it enacted, That any person within the limits of this State who shall knowingly communicate, or be instrumental in communicating by any direct or indirect means, a contagious disease, such as small-pox or scarlet fever, or venereal disease, shall be deemed guilty of a misdemeanor, and shall be subject, upon conviction in any of the Circuit Courts of the counties of this State, or in the Criminal Court of the City of . . . to a punishment of six months' imprisonment in the . . .



ARTICLE II. — And be it further enacted, That if any person being the owner or occupier of any house, room, or place, within the limits of this State, having reasonable cause to believe any person therein to be affected with a contagious disease, fails to make that fact known to the proper health authorities, he or she shall be deemed guilty of a misdemeanor; and, on summary conviction in one of the Circuit Courts of this State or in the Criminal Court of the City of . . . shall be liable to a penalty not exceeding one hundred dollars; or, at the discretion of the judges of said Circuit Courts, or the judge of the said Criminal Court of . . . City, be imprisoned in the jail of the county in which said person shall be convicted, or in the . . . city jail, for any term not exceeding six months: Provided, that a conviction under this enactment shall not exempt the offender from any penal or other consequences to which he or she may be liable for keeping, or being concerned in keeping a bawdy house, or disorderly house.

ARTICLE III. — And be it further enacted, That the State Board of Health, with the approval of the Governor and the Health Board of the City of . . . with the approval of the Mayor of said city, shall have power to institute and carry out all suitable means to prevent the spread of diseases of a contagious character, and may, if deemed advisable, remove to proper hospitals selected by them, all persons suffering from contagious diseases, who, neglecting necessary precautions, imperil the health of the community.

ARTICLE IV. — And be it further enacted, That this Act shall go into effect on the first day of . . .

Respectfully submitted,

ALBERT L. GIHON, M. D.,

(*Medical Director U. S. Navy*), *Chairman.*

DANIEL C. HOLLIDAY, M. D.,

(*New Orleans, La.*)

J. M. KELLER, M. D.,

(*Hot Springs, Ark.*)

GEORGE M. STERNBERG, M. D.,

(*Surgeon U. S. Army.*)

PRESTON H. BAILHACHE, M. D.,

(*U. S. M. H. Service.*)

JOHN MORRIS, M. D.,

(*Baltimore, Md.*)

[NOTE. — All the members of the Committee agree upon this Report; but Dr. Morris makes an additional individual Report of his further views, as follows.      SECRETARY.]

#### ADDITIONAL REPORT SUBMITTED BY DR. JOHN MORRIS AS A MINORITY REPORT.

The undersigned, whilst agreeing entirely with the views submitted in the Report of the Committee on the Prevention of Venereal Diseases, and approving of the proposed Act submitted by the Committee, as far as it goes, does not believe that the provisions of the Act are sufficiently comprehensive to effect the desired end, and he therefore begs leave to submit

the draft of a law, wider in range and more specific in character, a law, which if carried out he believes will greatly inure to the health of the community and the well-being of society.

In the Act appended it has been provided, as a first step, that all persons engaged in habits of prostitution shall be registered. This as a police regulation will add very much to the safety of the people. It will be compulsory upon all those visiting as well as those living in houses of prostitution. It is well known that the women most dangerous to the health of the community frequent, but do not live in houses of ill fame. It is important that this very dangerous class should be brought under police surveillance. The very fact of their being compelled to register their names will deter them from visiting houses of prostitution, and thus the number of secret prostitutions will be much reduced. This procedure is not at all arbitrary, but a necessary police arrangement. The burglar, the thief, the robber, the counterfeiter, and all persons known to the police as dangerous to society are compelled to submit to inspection and to be photographed for future identification. The prostitute may very properly be ranked among the dangerous classes, and her personal conduct should be a matter of police supervision. She should be watched and guarded, and as far as possible prevented from plying her occupation to the detriment of the public health. Her registration is the first step towards this end. The medical examination and the detention in the hospital, when necessary, are the only means by which her existence can be made tolerable in the community. In framing the Act, the undersigned has provided as far as possible against interfering with the liberty of the subject, and has endeavored to make the burdens of the Act bear as lightly as possible upon those brought under its provisions. He has, therefore, provided that an examination by any medical gentleman of good standing, made at stated periods, will be sufficient to exempt women from an examination by the public officer of health. How far this will prove effective in carrying out the intentions of the Committee remains to be seen. It was, however, thought best to insert this clause, so that the Act might be rendered less objectionable to many persons who oppose public examination of women. Should it prove after trial that this privilege should be withdrawn, the Act can be amended at some future day. It will be observed that the undersigned has avoided in the proposed law any system of licensing prostitution, a feature which has appeared objectionable in all laws heretofore enacted on the subject. It will also be observed that no tax is imposed or no charge made for medical services to those coming under the provisions of the bill. It is solely a State sanitary measure, intended not only for the good of those subject to the law, but for the community at large.

Respectfully submitted,

JOHN MORRIS, M. D.

AN ACT ENTITLED, AN ACT TO PREVENT THE SPREAD OF SYPHILITIC DISEASES  
IN THE CITY OF BALTIMORE.

ARTICLE I. — Be it enacted by the General Assembly of Maryland, That

it shall be the duty of every person being the owner or occupier of any house, room, or place used for purposes of prostitution within the limits of the city of Baltimore, or being the manager or assistant in the management of such house, room, or place, to register in the office of the marshal of police of said city the names of all persons living in said house, room, or place, and all persons visiting said house, room, or place, for purposes of prostitution, and any one failing to carry out this enactment shall be deemed guilty of a misdemeanor, and shall upon conviction before a justice of the peace, or in the Criminal Court of Baltimore city, be liable to a penalty of one hundred dollars.

ARTICLE II. — It shall be the duty of every woman registered under this Act to be examined twice in each month by one of the police physicians of Baltimore, hereafter to be appointed under this Act, or by some respectable private physician, whose certificate will be deemed sufficient for the purpose of its being ascertained whether such woman is suffering from venereal disease; and in case any woman shall refuse to appear at the time and place appointed for examination, or shall refuse to be visited for such purposes, she shall be subject, upon conviction in the Criminal Court of Baltimore city, to a punishment of three months' imprisonment, in the House of Correction of the State of Maryland, it being, however, provided, that said punishment shall be remitted as soon as the person sentenced shall consent to a medical examination.

ARTICLE III. — And be it enacted, That it shall be the duty of the police physicians appointed under this Act to report to the Health Commissioner of the city of Baltimore the names and addresses of all persons suffering from venereal disease; and it shall be the duty of said Health Commissioner to have such persons removed to a hospital or hospitals, or to the House of the Good Shepherd of the city of Baltimore, and detained there until entirely healed; said hospital or hospitals to be by him designated.

ARTICLE IV. — And be it enacted, That any woman refusing to submit to detention for the purposes before mentioned, shall be liable, on conviction in the Criminal Court of Baltimore city, to punishment, by imprisonment in the House of Correction of the State of Maryland for a term not exceeding three months.

ARTICLE V. — And be it enacted, That the certificate of the resident physician of the hospital to which the woman is consigned shall be deemed sufficient evidence of the healthfulness of any woman committed to said hospital, and on obtaining such certificate the woman shall be discharged from further medical care.

ARTICLE VI. — And be it enacted, That it shall be the duty of the Board of Police Commissioners of Baltimore city to annually estimate the sum of money necessary for the carrying out of the provisions of the Act, and they shall certify the same to the Mayor and City Council of Baltimore as a part of the current expenses of the said Board, and the same shall be collected by the city of Baltimore as a part of the police tax of said city, as provided for under Section 812, Chapter 367, of the Acts of 1867.

ARTICLE VII. — And be it enacted, That it shall be the duty of the Mayor



of the city of Baltimore to appoint annually, with the concurrence of both branches of the City Council of said city, four regularly educated medical men of good character as police physicians to perform the duties enjoined by this Act; and further, it shall be the duty of the Health Commissioner of the city of Baltimore to divide said city into four districts or departments, to each of which one of the physicians before mentioned shall be assigned.

ARTICLE VIII. — And be it enacted, That it shall be the duty of the police physicians appointed under this Act to prescribe times and places for the examination of prostitutes, notice of which shall be given in writing. If any woman detained in an hospital considers herself entitled to be discharged therefrom, and the chief medical officer of the hospital refuses to discharge her, such woman shall on her request be conveyed before a justice of the peace, who, if he is satisfied upon reasonable evidence that she is free from a contagious disease, shall discharge her from such hospital, and such order of discharge shall have the same effect as the discharge of the chief medical officer.

ARTICLE IX. — And be it enacted, That if any woman subject to a medical examination under this Act desires to be relieved therefrom and, not being under detention in a hospital, makes application in writing in that behalf to a justice of the peace of the city of Baltimore, the justice shall appoint by a notice in writing a time and place for the hearing of the application, and shall cause the notice to be delivered to the applicant, and a copy of the application and of the notice to be delivered to the marshal of police.

ARTICLE X. — And be it enacted, That if on the hearing of the application it is shown to the satisfaction of the justice of the peace that the applicant has ceased to be a common prostitute, or if the applicant with the approval of the justice enters into a recognizance with or without sureties, as to the justice seems meet, for her good behavior during three months thereafter, the justice shall order that she be relieved from the periodical medical examination.

ARTICLE XI. — And be it enacted, That every such recognizance shall be deemed to be forfeited if at any time during the prescribed term the woman to whom it relates is discovered within the limits of the city of Baltimore in any public thoroughfare, street, or place for the purposes of prostitution, or otherwise conducts herself as a common prostitute.

ARTICLE XII. — And be it enacted, That if any person being the owner, or occupier of any house, room, or place, within the limits of the city of Baltimore, or being a manager or assistant in the management thereof, having reasonable cause to believe any woman to be a common prostitute and to be affected with a contagious disease, induces or suffers her to resort to, or be in, that house, room, or place, for the purpose of prostitution, he or she shall be guilty of an offense against this Act, and on summary conviction thereof in the Criminal Court of the city of Baltimore shall be liable to a penalty not exceeding one hundred dollars, or at the discretion of the judge of said Criminal Court, be imprisoned in the Baltimore City jail for any term not exceeding six months: Provided, that a conviction

under this enactment shall not exempt the offender from any penal or other consequences to which he or she may be liable for keeping, or being concerned in keeping a bawdy house, or disorderly house.

ARTICLE XIII. — And be it enacted, That any notice or order, or other instrument required to be served by this Act on a woman, shall be served by delivery thereof to some person for her at her usual place of abode, or by delivery thereof to her personally.

ARTICLE XIV. — And be it enacted, That any action or prosecution under this Act shall be commenced within three months after the offense done, and not afterwards; and notice in writing of any such action and of the cause thereof shall be given to the intended defendant one month at least before the commencement of the action.

ARTICLE XV. — And be it enacted, That all fines collected under this Act shall be paid into the Treasury of the City of Baltimore.

ARTICLE XVI. — And be it enacted, That any confession or information, or knowledge of fact under this Act, shall not be given or received as evidence in any Court of Justice in this State.

ARTICLE XVII. — And be it further enacted, That this Act shall go into effect on the first day of      , eighteen hundred and      .

#### REPORT OF THE COMMITTEE ON THE MANAGEMENT OF EPIDEMICS.

MAJOR W. T. WALTHALL, Mobile, Ala., Chairman.

*To the President and Members of the American Public Health Association:—*

GENTLEMEN, — The undersigned, from the Committee appointed at the last annual meeting of the Association upon the management (other than professional) of epidemics—including the distribution of relief to the needy, the securing of competent nurses, and the like—has the honor to report:—

That, in accordance with usage, and indeed of necessity in the case of a Committee so widely dispersed as ours, with no opportunity for personal conference during the year, the duty of collecting materials and preparing a report was intrusted to the chairman. That, being deeply interested in the subject, he had made arrangements to devote sufficient attention during the summer and autumn to its examination and the preparation of a report thereon; but that, unfortunately, protracted illness, followed by an attack of sunstroke in the month of July, left him in a condition which rendered continuous mental or physical labor practically impossible, until a date so recent that no time was left for communication with the other members of the Committee, or for the collection of the necessary information.

The undersigned deeply regrets that, under the circumstances, it becomes necessary to offer an apology, instead of presenting a report. He acknowledges that he alone is responsible for the failure, but hopes that it will be condoned, as not occasioned by willful negligence or indifference, but by circumstances beyond his control.

This communication has been postponed to this late moment, in the hope—not abandoned until to-day—of being able to attend the meeting of the

Association, and conferring in person with such members of the Committee as may be present, before presenting it. Being prevented from such conference, the undersigned is obliged to present it on his own behalf, trusting that his colleagues of the Committee will agree with him in asking the indulgence of the Association, and that further time may be granted them, or the subject assigned to another committee, as may be agreeable to the will of the Association.

All which is respectfully submitted,

W. T. WALTHALL, *Chairman.*

BLOXI, MISS., November 29, 1881.

## REPORT OF THE COMMITTEE ON COMPULSORY VACCINATION.

DR. JAMES H. LETCHER, of Kentucky, *Chairman.*

[NOTE. — The Committee proposed to present a report at a late hour of the session, but desired to submit the Resolutions which follow, as its conclusions. The Association, after consideration of the Resolutions, re-committed them for further report thereon. — SECRETARY.]

*Resolved*, That this Association, through its "Committee on Compulsory Vaccination, and Re-vaccination," ask all State Medical Societies, and State Boards of Health, to endeavor, as far as possible, to procure the enactment of laws in their respective cities, counties, and States, compelling vaccination and re-vaccination.

*Resolved*, That the "American Medical Association," be asked to lend its aid and influence in the furtherance of compulsory vaccination and re-vaccination.

*Resolved*, That the Governor of each State in the Union be communicated with concerning this matter, with the request that in his next annual message to the law-makers, he call their attention to the importance of the speedy enactment of laws touching this question.

*Resolved*, That the United States Government, through its Chief Magistrate, have its attention directed to the need of a national law on compulsory vaccination and re-vaccination, and at all events, that it be advised of the importance of compelling all foreigners who come to make their homes with us, unless they can give proof of successful vaccination, to be vaccinated immediately upon their arrival here.

## REPORT OF THE COMMITTEE ON VITAL STATISTICS.

DR. ELISHA S. HARRIS, of New York, *Chairman.*

The following are the leading conclusions and propositions concerning the conditions necessary for securing correctness, completeness, and uniformity in registry and vital statistics in the United States :

### CONCLUSIONS.

1. That the accuracy and proper fullness of each individual record must be secured, and made trustworthy as a basis of correct statistics, as well as to insure the various rights and interests concerned in registration. To fail to attain this would vitiate the registration and all statistical uses of it.

2. The accuracy and validity of the individual registries in the United States will depend chiefly upon the careful verification and attesting of the



individual records as presented in the certificates signed by professional attendants at birth, death, and marriage ; and for this reason, as well as for others, the certificates for registration should be made out immediately upon the events respectively to be recorded, and should be attested by the autograph signature of such attendants ; also that whatever events and facts cannot be so attested by professional attendants must be verified and attested as completely as possible by means that are correct and legally sufficient. Herein must each State provide methods and requirements consistent with its laws and the system of administering them. The methods may differ — as greatly as they must between Louisiana and Georgia, and Georgia and New York — but uniformity of record and all necessary correctness, duly attested by trustworthy signatures, must be secured.

3. The areas of municipal or tax districts will necessarily for the present determine the areas of local registration of vital statistics, as all that pertains to this class of public duties should be made a public charge. The city, the township, and the State, where there are townships : but the county, parish, and State, as well as city, in the other parts of our Union, are the divisions of the registry areas for the nation. The incorporated village has municipal methods, and is usually one of the primary registration areas. But a State may quite reasonably undertake to canvass and record all the births, deaths, and marriages occurring in it ; though better doubtless that each primary community, or first civil division in a State, should do its whole duty and bear all necessary costs of the registry duties which local government owes to the community, upon a principle analogous to that which provides for property and estate records, etc.

4. Experience shows that in order to secure the necessary correctness and completeness of each individual record for public registration, the community and taxed district, the householder (the hospital or institution), the family and the kinsfolk must be concerned in the making out and correct presentation of the certified or attested records. A city or State may canvass for the records at stated periods, and may even trust to undertakers, grave-diggers, and old women to give in the records to the canvassers, but such records would be nearly valueless. The salaries of canvassers would be poorly earned unless they are guided and instructed by a central genius, who, like Dr. Snow, in Providence, can personally detect and correct their frequent fallacies and errors. It really appears almost inevitable that, for the present, the registration in each State will need to use the local authorities as organized and placed in the primary taxing districts, and in order to insure trustworthy correctness and accuracy, must also use that class of the local authorities which is most enlightened, interested, and legally competent to enforce the individual recording and the local registry. The records of mortality must be under the direction of sanitary authorities, if possible, yet each State will determine what other local officials shall have a responsible part in the duties pertaining to local registration. Constant inspection and revision of the local records are necessary to correctness and completeness. At the centre of all and directing all the registry system of a State there must be a head. The head should be responsible for all that is

necessary to success in the system. He must be continually advising, aiding, correcting, and receiving. He should be umpire in respect of doubtful and disputed points, and he must prescribe or at least keep up a uniform system of forms.

5. The registry as organized and kept fire-proof at every State capital should be the best possible outcome of the local registry. It is worthy to be the most permanent and well preserved of all branches or kinds of public records. It is at the State registry chambers or bureau that absolute uniformity of registration in the thirty-eight States — for the nation — begins. It is easy for thirty-eight central registering heads to agree, and even the forms adopted by one State may readily, as regards any facts to be entered in the public registries, be models for all the States and for every municipality and taxing district in North America.

6. The introduction of special and separate points for replies in the primary certificates in a particular municipality for a limited time, as should be the case in the midst of epidemics and calamities, is a duty of the local authorities and will not impair the uniformity of public registering. Uniformity will be secured wherever the State system has a competent head and all the States shall have each a head and proper laws.

7. The necessary standard nomenclature in the records of mortality should be well understood by the State registering heads, or bureaux, should be well harmonized. The most correctly employed and widely accepted nosological and statistical nomenclature must be used at each State registry bureau and must be inculcated in each locality by physicians and registrars; yet it is well to remember that the best of the common names of causes of death are quite intelligible, and that this is true of records of deaths made a century ago, though nearly all the common names of causes of death have been superseded, since that period, by more scientific and accurate ones. The national councils of physicians and the National Board of Health are leading towards a reasonable uniformity in nomenclature by their increasing the knowledge of the great variety of causes of death and by reasonably augmenting the catalogue of correctly discriminated diseases. In this respect we have the means of increased accuracy in registration of causes of death. Any educated medical man who is competent to be a municipal or a State registrar or superintendent of registration of vital statistics will so enter the causes of death upon the pages of the public registers that the names of the causes will be correctly interpreted in all coming time. The fact, the date, the causes, or certainly the mode of death, must be correctly given. It is of great importance to the public welfare as regards the most important facts and disclosures of sanitary knowledge and conservative medicine, that the public registry as well as the professional certifying of the causes of death should be sought at the most competent hands. Public registration is a service rendered for the State, and from the writing and attesting the primary record to the critical and final registering of it in the State archives, no slighting or fault in the elements of the individual record is allowable. The units in vital statistics must be kept clear from obscure or false reading. All that is attempted by local and State authorities in

this field of public duty should be well done. It then will be done cheaply enough, for we find that the faulty and defective methods of obtaining and verifying the primary records actually cost more per capita or per number than the most accurate and complete work would cost were the State to organize its control and detailed duties so as to make good work.

Finally: the rapid organization of the public service of twenty-eight State Boards of Health, the recent endeavors of the National Board of Health to develop the basis for a truly national system of registry and vital statistics; the enlightened action of the American Association for the Promotion of Science, and of the Meteorological Society, and of the growing interest of publicists and of all sanitarians and efficient Boards of Health, together with the greatly enlarged intelligence of our people in regard to the public duty of correctly recording the essential facts of the three great epochs of life, now warrant the action proposed.

This subject is worthy of all the attention it is receiving, and we may perhaps best express to the Association the convictions of its Committee on Vital Statistics by uniting in the opinion of Dr. William Farr, of England, who recently wrote to a friend in the United States:—

“I speak from long experience when I say and feel that your sanitary and social progress very much depends upon a registration as general and uniform as your census. . . . By obtaining an accurate record of births and marriages, and of deaths (with the causes), you will confer the greatest benefit on your country.”

In addition to this general report your committee has the honor to report as follows upon papers and subjects referred to it by the Association as bearing on vital statistics:—

We have the honor to present to you, for any attention the subject at present demands of the Association, a brief return, with comments and suggestions upon one of the papers which has been referred officially to this Committee, namely, a communication from E. B. Elliott, Esq., Statistician and Actuary, connected with the Treasury and Light-house Departments at Washington. and who, as a member of the American Association for the Promotion of Science, has twice or more presented a report of progress upon the subject of the resolution here referred to. The resolution is as follows:—

*Resolved,* That the Congress of the United States be respectfully requested to take such steps as may seem to them advisable to secure a proper coöperation between the General Government and the several State governments of the United States, to establish a common, uniform, and efficient system for the registration of the births, deaths, and marriages of the people.”

The above resolution was adopted by the American Association for the Advancement of Science at its meeting in St. Louis, in 1878, and renewed at its meeting in Boston in 1880, and the resolution was referred for proper disposition to a committee, consisting of Messrs. E. B. Elliott, Franklin B. Hough, Edward T. Cox, Joseph S. Ropes, J. B. Killbrew, and John Collett.

Mr. Elliott's report, as presented in 1880, to the Scientific Association here mentioned is herewith annexed, marked “B.”



On behalf of the Public Health Association committee, I respectfully invite the attention of this Association, through you, to the chief points here made in the Scientific Association's report ; and I would premise by stating that it is now more than thirty years since the Scientific Associations — the design of which is well exemplified in the American Association for Promoting Science, and now, perhaps more fully, in the American Public Health Association — have placed on record the important testimony to the necessity and duty of accurate records of the three great epochs in human life, namely, birth, marriage, and death.

At the meeting of the Association in Baltimore in 1875, Mr. Elliott, as a member, offered resolutions similar to those above recited. That resolution is here annexed, marked "A." We are warranted in considering that this class of records, publicly registered, are dutifully required at the hands of the proper authorities of every State and nation.

The Scientific Association's report correctly states that the want of an efficient system of registration of vital statistics is felt in this country.

First. To facilitate the just transfer of heritable property.

Second. As a means of ascertaining the relative salubrity of localities, and for the computation of life and annuity tables, and especially a correct knowledge of future duration or chance of life.

Third. That it is an important question, and has become of national as well as State importance, to determine how the State governments shall co-operate to establish uniformity and completeness in their registration, and how the General Government shall coöperate with each and all.

Fourth. That it is plainly a difficult, if not an impracticable matter for the National Government to undertake the sole direction of registration in the several States.

Fifth. That if intrusted exclusively to the respective States, without co-ordination of plans, and without coöperation of the General Government, some and perhaps many of the States, will neglect the duty altogether, or perform it irregularly and unworthily, certainly without such uniformity as is essential to correct comparison of results.

Sixth. That coöperation and coördination of the States and the Federal Government in this matter "seems to present the only hopeful means for effecting the desired end."

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I have the pleasure to recall to your attention the fact that the report on this subject, as made to the Public Health Association, at its meeting in Chicago, September, 1877, took the same ground ; and this Association may consistently abide by it, and without delay unite with the committee of the American Scientific Association in such appeals and endeavors, during the approaching session of Congress, as will best promote the objects set forth in our own report as made in 1877, and the report which has so courteously been submitted to our Association by Professor Elliott's committee.

It appears that the Meteorological Association, of which Dr. F. A. P.

Barnard, of Columbia College, is President, has adopted resolutions of the same import, and that the way appears open to present this subject at an early period of the next session of Congress.

Several of the members of last Congress expressed great interest in the subject. Among others Senators J. S. Morrill and G. H. Pendleton, and no doubt the ablest statesmen of both Houses of the Forty-seventh Congress will be enabled to take an enlightened interest in this matter.

Experience in the State of New York, and careful examination of the registration systems and the condition of vital statistics in the several States and in national service, warrant me in the conclusion that it is necessary for each State to adopt a system of registration of vital statistics as nearly perfect as now practicable, and to make its system entirely conformable to equally good systems in the other States. In short, the State system may be nearly identical in all our (thirty-eight) States, though the methods and the administration in detail may be as different in numerous particulars as are the differences that now exist in the several States of United Germany. In the New England and Middle States, the town system of local government is such that it is desirable to employ town authorities to the extent to which they are available, in enforcing and providing for all the duties, in detail, of certifying and registering the records. In the Southern and most of the Western States, the local authority is organized in a different manner, and in those States the methods in detail of obtaining the records for registry and the areas of local registration will be so different as to be suitably conformable to the plan and methods of the local government; but at the central office of registration in each of the States and Territories, and in the departments of the National Government that should have complete registry of their vital statistics, precisely the same forms of results in registered columns and lines should, and can be made entirely uniform.

After much correspondence with Dr. Farr, Dr. Janssens, Dr. Bock, Professor Beneke, and others who have a right to lead in plans for perfect registration of vital statistics of States and nations, I have no hesitation in recording my conclusion that uniform results can and must, under existing circumstances, be maintained by methods quite as diverse in their details as are the forms of local government administration.

This is actually the necessity that confronts us in the United States concerning all this matter of uniform, or in any sense complete and adequate, registration of vital statistics.

The accompanying preamble and resolution are respectfully submitted for such consideration as you may secure for them at the tenth meeting of the American Public Health Association:—

*Preamble and resolutions relating to completeness and uniformity of records of births, deaths, and marriages, and concerning coördination of efforts and laws to secure this result.*

*Whereas, The American Public Health Association, recognizing the fact that a correct knowledge and use of vital statistics, and especially of the records of mortality and disease, are essential to the science and duties of public hygiene; therefore,*

*Resolved*, That this Association fully concurs in the recommendations which have been made at several sessions of the American Association for the Promotion of Science, and at successive annual meetings of the American Public Health Association.

*Resolved*, That the report and papers herewith submitted from the Committee on Vital Statistics be referred to said committee, to revise and suitably present to the forty-seventh National Congress at an early period of its first session.

*Resolved*, That the National Board of Health is hereby requested to coöperate and lead in the effort to secure uniform results in registration of births, deaths, and marriages throughout the nation ; and that said Board is earnestly requested to procure such action of the National Congress and the adoption of such methods and regulations in all departments of the military, naval, and civil service, as should be enforced by national laws and regulations.

*Resolved*, That accurate and faithful registration of deaths and the causes of death should be enforced in every State and Territory under suitable statutes, by local and State Boards of Health, or, at least, under the immediate supervision of such boards.

*Resolved*, That by whatever methods the most complete and perfect registration may be secured in the respective States, the results of such registration should present the vital statistics of the people complete and readily comparable under each and all branches, that such uniformity of results may constitute the uniformity of system which this Association asks for in the name of the States and the nation.

*Resolved*, That the several State Boards of Health are respectfully urged to do whatever they can to promote the completeness and uniformity of registration in vital statistics of the respective States, and that in order to promote their effectual coöperation, copies of this report be placed in the hands of each of the State Boards of Health, and also be transmitted to each of the Governors of the States and Territories.

*Resolved*, That the American Public Health Association's Committee on Registration and Vital Statistics is hereby directed to continue its duties under the Association, and to coöperate with the National Board of Health as opportunity is afforded to promote the desired action of the State and National Legislatures and of the Boards of Health.

#### REPORT OF THE COMMITTEE ON NECROLOGY.

The Committee on Necrology begs leave to submit the following as the mortuary record of the year past, sadly full of new proofs that "*death loves a shining mark* : " —

DR. GEORGE S. BLACKIE, M. D., Ph. D., Professor of Chemistry in the Medical Department of the University of Tennessee, a member of the American Public Health Association of the year 1879, died at his home at Nashville, Tenn., June 19, 1881. He was a most scholarly and brilliant scientist, a broad and excellent man in every walk of life. His interest in sanitary science was great, he held several positions of sanitary authority, and did much with his pen to aid the advance of interest in public health, especially in connection with prisoners. At the time of his death he was senior editor of the "Southern Practitioner." Of his highly and exceptionally honorable career, Atkinson says of him : —



Dr. Blackie was a "son of Alexander Blackie, banker, great-grandson of James Watts, of steam-engine celebrity; cousin of John Gibson Lockhart, the son-in-law of Sir Walter Scott; cousin of Lord Jeffrey of the 'Edinburgh Review,' and brother of Prof. John S. Blackie, now of the University of Edinburgh. He was born at Aberdeen, Scotland, April 10, 1834. He was educated at the Edinburgh institution; in arts at Aberdeen; in medicine at Edinburgh, and also at the universities of Bonn, Berlin, and Paris. He was A. M., M. D., gold medalist, and three stars (highest honors), University of Edinburgh, 1855, gold medalist in botany, 1852, and Ph. D. University of Lebanon, Tenn., 1874. He first was resident physician at Mowcroft private lunatic asylum near London; then established himself in practice at Kelso, Scotland; and subsequently in Nashville, Tenn., in 1857, where he has since resided except during 1873 and 1874, which he passed in teaching in New York. His specialty was the natural sciences. He was a Fellow of the Botanical Society of Edinburgh, 1852, and its curator in 1855 and 1856; member of the Edinburgh Geological Society in 1854; of the Medico-Chirurgical Society in Edinburgh, 1856; corresponding member of the New Orleans Academy of Science, 1866; member of the Council of the University of Edinburgh, 1873; of the American Association for the Advancement of Science, 1876; Fellow of the same, 1877; of the State Medical Society of Tennessee, 1857; of the Medical Society of Nashville, 1857; and was Secretary of the same for eleven years; was Commissioner from Tennessee to the Prison Convention held in London in 1872; and member of the Troy Scientific Institution, 1877, etc. He is the author of 'Cretins and Cretinism,' Edinburgh, 8vo, 1855; contributions to the 'London Botanical Gazette,' to the 'Medical Flora of Tennessee,' 1857; 'Botany, the Ally of Medicine,' Nashville, 1858; contributions to 'Nashville Medical Journal' and 'North American Medico-Chirurgical Review,' etc.; and was twelve years one of the editors of the 'Nashville Medical Journal,' etc. Besides the above, he was the author of 'History of the Military Monkish Orders of the Middle Ages,' and contributions to literary journals and magazines, etc. He was Professor of Botany in the Medical Department of the University of Nashville in 1856; Professor of Chemistry and Natural History in the same institution in 1857; Professor of Botany, Tennessee College of Pharmacy, elected in 1874; and Professor of Chemistry, Nashville Medical College, elected in 1877."

Dr. Blackie was in active professional service with the Southern army for three years during the late war, and rendered distinguished service. He held high rank, and received many honors as an active member of the Masonic order. He was an ardent Christian and a vestryman of his church. His home life was universally remarked upon as touchingly beautiful. His associate editor upon the "Practitioner," in his obituary says: "Would that we had his fluent pen and versatile talent to place upon record a few of the many bright virtues that adorned and beautified an almost blameless life."

DR. GREENVILLE DOWELL, of Galveston, Texas, a member of the American Public Health Association, of the year 1878, died in that State the

current year. He was a man of rugged strength of character and unusual powers of mind, of remarkably original views and self-reliance. His interest in sanitary science and its administrative expression made him an early member of this Association. He was a member of other medical societies, and made several valuable contributions upon medical and surgical subjects. He was a bold operator, and at one time made the then novel attempt to "anchor" a floating kidney by passing a needle and thread through it and attaching it to the side. Dr. White, of New Orleans, says of it: "It was stated that urine passed out through the wound. We believed it all false, but when Dr. Smyth cut out the same 'roving kidney,' it had the mark right through it, from end to end, but slightly transverse. That surgery of Dowell was bold and original."

He was a man whose exterior little betokened the native powers and warm heart that beat beneath, and his tall form and rugged features will be greatly missed where he was best known.

DR. WILLIAM C. GLAZIER, U. S. Marine Hospital Service, a member of the American Public Health Association, of the year 1878, died at Key West, Fla., December 12, 1880.

Dr. Glazier was born in Erie, Erie County, Pennsylvania, May 6, 1839. He was self educated. Commenced the study of medicine in 1863, his medical studies being more or less interrupted until 1870. He graduated from the Cincinnati College of Medicine in 1871, and from the medical department of the University of the City of New York, in 1876. He served as Acting Assistant Surgeon, U. S. Army, from August, 1872, to November, 1875, and from November, 1874, to November, 1875, was post surgeon at Fort Ellis, Montana. During the year 1877, he served as an assistant in the out-door department of Bellevue Hospital. He was appointed an acting assistant surgeon of the Marine Hospital Service August 23, 1878, and assigned to duty at the port of New York. He was appointed an assistant surgeon in the service, May 5, 1879, and reassigned to duty at New York. Was transferred to Charleston, S. C., in June, 1879, and to Key West, Fla., in November, 1879. He died at Key West, December 12, 1880, of yellow fever, contracted while in the performance of his duties.

While stationed at Charleston, Assistant Surgeon Glazier was directed to investigate and report to the Surgeon-General of the Marine Hospital Service, upon the subject of trichinæ in American pork and other meat. This report, received but a few days prior to his death, was published by order of Congress in January, 1881. Dr. Glazier's merit as a painstaking investigator was fully appreciated by his department, and his compilation on the subject of "Trichinæ and Trichinosis" is certain to be the basis of all future work on this subject in this country. Dr. Glazier was an accomplished draughtsman, and specimens of his handiwork may be seen not only in the work referred to, but in the recent work on operative surgery, by Prof. Stephen Smith, of New York. Dr. Glazier's illness, of which he died, is said to have been contracted by reason of his professional zeal, which led him to study yellow fever in the hospitals of Havana, whither he went

for the purpose, although unacclimated. Such men are too rare in this world to be buried with a mere passing reference to their character or attainments. His was a superior order of bravery to that which seeks fame at the cannon's mouth, and the memory of Dr. Glazier will always be a bright one among the many heroes of the medical profession.

DR. EDWARD LLOYD HOWARD, of Baltimore, Md., President of the State Board of Health of Maryland, a member of the American Public Health Association, of the year 1874, was drowned at Baltimore, September 5, 1881. The "Journal," of which he was joint editor, says of him : —

"Dr. Howard was born in Baltimore, January 14, 1837. He was a grandson, on the one side, of Gen. John Eager Howard, the Revolutionary hero, and on the other of Francis S. Key, the author of the 'Star Spangled Banner.' After receiving a liberal academic training he attended lectures at the University of Maryland, receiving his degree in 1861. Shortly after, he went south, and espoused the Confederate cause. Notwithstanding his youth, his ability was so conspicuous that upon the recommendation of the medical examining board, he received from the Confederate States government an immediate appointment as full surgeon. He served during the war with distinction in several positions of prominence and responsibility, and at its close returned to Baltimore and resumed his practice. Since that period he has taken a leading part in medical affairs in Maryland, and has been honored in many ways. At the time of his death he was President of the Maryland State Board of Health, Resident Physician of the Marine (Quarantine) Hospital, Professor of *Materia Medica*, Therapeutics, and Medical Jurisprudence in the College of Physicians and Surgeons, and Professor of Chemistry in the Baltimore College of Dental Surgery. He had previously held the position of Secretary of the State Board of Health, which was established through his efforts and influence. He was one of the founders and first faculty of the College of Physicians and Surgeons. He was one of the three members of the Yellow Fever Commission appointed in 1878 by the Government to investigate the yellow fever epidemic then raging in the lower Mississippi Valley. He edited jointly with Dr. Latimer, in 1870-71, the 'Baltimore Medical Journal.' He had a remarkable faculty for seeing through a subject and mastering its details. His style was concise and pointed, his logic lucid and convincing. Few men could say as much in a few words and with so much effect. These qualities gave him great advantage in debate, in which he had not his superior, and they fully compensated for his rather youthful appearance and under medium size. He had a wonderful equanimity, which seemed incapable of being disturbed. He was a man of high and honorable instincts and of sincere, unassuming, and refined manners. His courage was of the highest order and he never shrank from exposure to the most malignant forms of disease, but was always ready to offer his services in cases of epidemic or pestilence."

Dr. Chancellor, long associated with him as an officer of the State Board of Health, writes of him : "He had long attained eminence as a physician and a sanitarian blended with the graces of a Christian gentleman. His



manners were kind, easy, and conciliatory. He was averse to strife and discussion; not from doubts as to the opinions he held, for few men were firmer in this respect, but from the benevolence of his disposition which made him shrink from wounding the sensibilities of others." The "Baltimore Sun" speaks of his death as "a public calamity."

DR. LEVIN SMITH JOYNES, A. B., M. D., I.L. D., a member of the American Public Health Association, of the year 1878. Born in Accomac County, Va., on May 13, 1819; died in Richmond, Va., January 18, 1881, in the sixty-second year of his life. At the early age of 16 years, he graduated as Bachelor of Arts in the Washington College of Pennsylvania, and then spent two years in the academic department of the University of Virginia. He next began the study of medicine, attending lectures at the University of Pennsylvania and afterwards at the University of Virginia, from which latter institution he graduated in medicine in 1839. He spent two years and a half in Paris and Dublin, and returning to America located in his native county. He removed to Baltimore in 1844, and thence to Philadelphia in 1846 to assume the Professorship of Physiology and Legal Medicine in the Franklin Medical College. In 1849 he returned to his home in Virginia and resumed practice. In 1855 he was elected Professor of the Institutes of Medicine and Medical Jurisprudence in the Medical College of Virginia at Richmond. In 1856 he was elected Dean of the Faculty, which position he held till 1871, resigning on account of ill health, and was then elected Emeritus Professor.

A year's respite from his arduous duties as Professor of Physiology (to which chair he was elected in 1857) restored him to health so that, as the "Virginia Medical Monthly" says, "When the State Board of Health of Virginia was established in 1872, he was elected its Secretary, and performed fully the duties of his responsible office, so far as the imperfect and ineffective laws of the State, as passed by the Legislature, would allow. All the apparent shortcomings of the Board of Health, so far as the duties of the Secretary were concerned, were due to imperfect legislation, and not to Dr. Joynes, to whom the State owes, and will ever owe, an unrequited obligation."

He was an active member of this Association in its early days. He became a member of the American Medical Association in 1847, and was the recipient of various honors from that body. A vigorous and elegant writer of wide celebrity, a safe and conservative adviser, a logical speaker, a staunch friend, a thorough student, his loss will be widely felt. Of him the "Virginia Monthly" says, "His was a life of consistency and devotion to the principles of the Christian faith."

DR. CHARLES H. SMITH, of Richmond, Va., a member of the American Public Health Association of the year 1878, and a warm friend of the advance of sanitary science, has also passed away during the current year, but the data for a more extended and accurate obituary are unfortunately not at hand, though promised.

DR. E. M. WIGHT, of Chattanooga, Tenn., member of the State Board of Health of Tennessee, a member of the American Public Health Association of the year 1879, died at Chattanooga, January 6, 1881, aged 39 years and 8 months. Of him, Dr. White, of New Orleans (the since lamented President of this Association), wrote:—

“He entered the army at the beginning of the war, rapidly rose from the ranks to be adjutant of the regiment. His health failing, he left the army to resume his medical studies, to gain his degree and return to the army as assistant surgeon. During his year of surgical service, he showed marked ability. At the close of the war he established himself in Chattanooga, whither the chances of the service had brought him, and was soon in the enjoyment of a large practice.

“Three times he was elected Mayor of the city, and during one of his terms of office, epidemic cholera overran Chattanooga, and the necessities of the times brought into high relief the ability of its mayor.

“Filling the chair of Diseases of the Chest at the Medical College of Nashville for a short time, he further increased his reputation. In the midst of an exciting and as he deemed a highly important political campaign in which he was candidate for Governor, yellow fever broke out in Chattanooga. Although not exempt from the fever by a previous attack, Dr. Wight immediately returned home and took ample share of the fatigue, the anxiety, the exceeding risk inseparable from such periods.

“Dr. Wight was the pioneer in the effort to secure a systematic collection and arrangement of the vital statistics of Tennessee, and in the advocacy of a State Board of Health. Of this State Board he was a member from the date of its organization until his death.

“Appointed an Inspector of the National Board of Health, in that capacity he arranged and carried out the land quarantine about Memphis, in 1879. Though greatly blamed and publicly found fault with by many at the time, in the end the intelligence of his plans and the practical effectiveness of his methods approved themselves to all.

“A local paper, after speaking of his character in the varied relations of man's life, closes by saying: ‘His record, both public and private, is without blot or stain.’”

He was a man of rare personal magnetism, great force of character, a broad philanthropy, most ardent, patriotic, ambitious, for the future of the State and Nation, a fearless, untiring, keen-sighted, and unselfish promoter of every good thing. Cut off in his early prime, he had yet lived long enough to prove his value and his character, to show how great is the loss of such a man.

DR. EASTON YONGE, of Savannah, Ga., a member of the American Public Health Association, of the year 1878, died of cancer, at Savannah, Ga., February 15, 1881.

Dr. Yonge was a man of fine natural abilities and excellent endowments. Of quiet but persistent disposition, he contributed much to the intelligence and happiness of those about him. He held several positions of responsibility and trust, and was warmly interested in the advance of sanitary science.

The absence of exact data, in the brief sketches of some of the members, deceased during the year, is regretted by the Committee, but the utmost diligence in correspondence, has failed to secure the much desired responses.

AZEL AMES, JR.,	} Committee on Necrol- ogy.
J. L. CABELL,	
E. M. HUNT,	
J. BERRIEN LINDSLEY,	
J. G. THOMAS,	

## ANNUAL REPORT OF DR. J. BERRIEN LINDSLEY, NASHVILLE, TENN.,

TREASURER OF THE AMERICAN PUBLIC HEALTH ASSOCIATION, NOVEMBER 29, 1881.

## RECEIPTS.

Balance brought forward . . . . .	\$705 00
Received from sale of "Public Health" . . . . .	98 00
Received for dues from members as per list in my hands, and per Treasurer's Book . . . . .	2,640 00
	<u>3,443 00</u>

## DISBURSEMENTS.

Paid for stationery, printing, and other office expenses of Secretary, Treasurer, and President . . . . .	\$428 52
Paid for called meeting of Executive Committee, June 21, 1881 . . . . .	75 00
Paid, on account of former volumes . . . . .	95 55
Paid for printing, binding, and mailing Vol. VI. . . . .	2,031 26
Balance on hand . . . . .	812 67
	<u>3,443 00</u>

*Note.*—The preliminary meeting at which this Association was organized, commenced in 1872. At said meeting, or for the year

1872-1873, 63 members paid . . . . .	Long Branch meeting.
1873-1874, 120 members paid . . . . .	New York meeting.
1874-1875, 177 members paid . . . . .	Philadelphia meeting.
1875-1876, 200 members paid . . . . .	Baltimore meeting.
1876-1877, 207 members paid . . . . .	Boston meeting.
1877-1878, 198 members paid . . . . .	Chicago meeting.
1878-1879, 250 members paid . . . . .	Richmond meeting.
1879-1880, 358 members paid . . . . .	Nashville meeting.
1880-1881, 451 members paid . . . . .	New Orleans meeting.

2,024

5 dollars each.

\$10,120 total,

by means of which six handsome and valuable volumes on sanitary science have been published and circulated.

All of which is respectfully submitted by

J. BERRIEN LINDSLEY, Treasurer.

Examined and approved by Auditing Committee.

JAMES E. REEVES, *Chairman.*

GUSTAVUS DEVRON, M. D.

R. RUTHERFORD, M. D.



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